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Integration through standardization
The Single Euro Payments Area (SEPA)

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Yhtenäisen euromaksualueen, SEPAn (Single Euro Payments Area), yksi perimmäisistä tavoitteista on tehostaa euromääräisten vähittäismaksumarkkinoiden toimintaa. Rajat ylittävä maksuliikenne mihinkä tahansa euroalueella tilin sijaintimaasta huolimatta tulee olla yhtä helppoa, tehokasta ja turvallista kuin kotimaassakin. Euromaiden osalta maksumarkkinoiden infrastruktuurirakenteet ovat pääasiallisesti olleet kansallisia monopoleja, jotka ovat ajan myötä kehittyneet palvelemaan näitä nimeomaisia kotimarkkinoita kansalliset maksutavat ja perinteet huomioonottaen. SEPA luo standardipohjan perustuen kansainvälisiin ISO 20022 -ratkaisuihin, jotka mahdollistavat kilpailun ja elektronisten maksutapojen käytön tehokkaasti ja kustannusystävällisesti näiden perinteisesti hyvinkin maakeskeisten vähittäismaksumarkkinoiden välillä.

Uusiin SEPA-standardien mukaisiin maksuinstrumentteihin kuuluvat SEPA-tilisiirto (SCT) ja SEPA-suoraveloitus (SDD) sekä korttimaksuja käsittelevä yhtenäinen korttimaksukehikko (SCF). SEPAn oikeudellisen perustan EU:ssa on muodostanut maksupalveludirektiivi (PSD). Siirtyminen uusiin maksuintrumentteihin on kuitenkin edelleen kesken ja se on määrä saada tilisiirron ja suoraveloituksen osalta päätökseen euroalueella viimeistään 1 helmikuuta 2014. Kortimaksamisen suhteen kehitys on ollut selkeästi hitaampaa eikä vastaavaa yhtenäistymisen astetta ole näkyvissä lähiaikoina. Rajat ylittävän kilpailun kiristyminen, prosessointikustannusten lasku ja tulevat maksamiseen liittyvät innovaatiot vaikuttaisivat olevan ne kanavat, joiden kautta varsinaiset SEPAn vaikutukset tulevat näkymään konkreettisimmin tulevaisuudessa niin kysyntä kuin tarjontapuolellakin. Suurtuotannon edut ja verkostotalouden teoria näyttäisivät muodostavan validin teoriapohjan kyseisten vaikutusten tarkastelulle.

Eurooppalainen vähittäismaksaminen on selkeästi murroksessa ja markinoilla on ollut nähtävissä merkittäviä muutoksia SEPAn lähtölaukauksena pidetyn vuoden 2001 jälkeisenä aikana. Havaittuja muutoksia ei kuitenkaan voida pitää vielä tässä vaiheessa lopullisina siirtymisen ollessa vielä kesken. Kansallisten maksutapojen yhtenäistyminen ja automatisoituminen yli rajojen tulevat todennäköisesti muokkaamaan nykyisiä markkinarakenteita merkittävissä määrin seuraavien vuosien aikana.

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GLOSSARY OF TERMS

ATM	Automated Teller Machine
BBAN	Basic Bank Account Number
B2B	Business-to-business
BIC	Bank Identifier Code (SWIFT)
CGI	Common Global Implementation
CSG	Cards Stakeholders Group
CSM	Clearing and Settlement Mechanism
EACHA	European Automated Clearing House Association
EBA	Euro Banking Association
EBPP	Electronic Bill Presentment and Payment
EC	European Commission
ECB	European Central Bank
ECSA	European Credit Sector Association
EMU	Economic and Monetary Union
EMV	Europay MasterCard Visa program
EPC	European Payments Council
ERP	Enterprise Resource Planning
EU	European Union
GDP	Gross Domestic Product
IBAN	International Bank Account Number
ICS	International Card Scheme
ISO	International Organization for Standardization
LVPS	Large Value Payment System
NFC	Near Field Communication
OBeP	Online Banking ePayment
POS	Point-of-Sale
PSD	Payment Services Directive
PSP	Payment Service Provider
PSU	Payment Service User
RPS	Retail Payment System
SCF	SEPA Cards Framework
SCT	SEPA Credit Transfer
SDD	SEPA Direct Debit
SECA	Single Euro Cash Area
SEPA	Singe Euro Payments Area
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer system
XML	eXtensible Markup Language

1. INTRODUCTION

After the formation of a single market and the introduction of a monetary union, the European Union (EU) is on the verge of entering a third phase of economic integration, the formation of a unified payments area. The complexity of this third phase is comparable to the founding and adoption of the single currency euro within the European Monetary Union (EMU) first as an accounting currency in 1999 and finally through euro banknotes and coins entering circulation in 2002. This initiative is known as the Single Euro Payments Area (SEPA) and is designed with the intention of enabling the same conditions, rights and obligations to make and receive payments in euro by all consumers, enterprises and other economic agents involved regardless of national boundaries. The member states involved in the project include all the European Union countries as well as Iceland, Norway, Liechtenstein, Monaco and Switzerland.

Unlike for the case of a common market or a common currency, no coherent economic theory exists that could be used to model and analyze the effects of a common payments area. Despite some progress especially in the field of empirical studies during the past years, academic literature on this topic remains extremely scarce when looking at the mere size of the SEPA project. Therefore, this thesis endeavors on providing an overall understanding of the various effects of the adoption of SEPA through theoretical reasoning backed up by empirical assessments of the project. We will review academic studies related to the SEPA project and by applying a relevant theoretical framework aim at creating an understanding of how SEPA as a phenomena will potentially reshape the future retail payments market in the EU and especially in the euro area.

Due to the inherent similarities between the telecommunications industry and the retail payments industry, the theory of network effects is used as the relevant theoretical base to analyze the potential future market structure implications. Additionally, the existence of economies of scale and scope are believed to play a crucial importance in payment service provision. By combining these two theoretical aspects, we hope to create an extensive theoretical basis by which we augment our analysis to focus on the potential future market structure outcomes that would be suggested by SEPA after full migration has taken place. As SEPA is undoubtedly an enlargement from former national domestic payment markets into one single “domestic” European payments market in euro, we analogously assume the theoretical

base staying relevant and only the magnitude of the effects increasing from former national to current pan-European effects.

As is the case with the telecommunications industry, the payments market is heavily dependent on strict communication standards between agents involved in the market. Therefore, SEPA is first and foremost viewed as being a standardization project. The purpose of this thesis is to grasp the full potential behind standardization in creating a harmonized competitive payments market with the possibility of becoming an innovative platform for future payments related development. Since SEPA is a market led development initiative propagated by the European Payments Council (EPC) as a result of regulation (EC) No 2560/2001 on equal charges for domestic and cross-border payments in euro, standardization is viewed in this thesis to be the result of an exogenous factor to the market. Nevertheless, it must be further emphasized that a unified payments area was originally a political undertaking to which SEPA can be viewed to be a response by the industry in order to answer the political aspirations behind the regulation in question. Keeping this in mind, our aim is to answer the following question: how will SEPA as a standardization initiative revolutionize the retail payments market for payments denominated in euro and consequently potentially also harmonize the fragmented payments landscape in the euro zone?

The analysis will be conducted by applying the relevant theoretical framework into looking on how SEPA will affect competition in the retail payment market, what are the implied cost and revenue implications as well as how SEPA will promote new business opportunities through innovation. The analysis will be conducted from the supply side's point of view relating to banks and automated clearing houses (ACH) as well as from the demand side's point of view relating to enterprises and consumers. The everyday business within the retail payment markets is closely intertwined between banks and ACHs as the payment services provided by the ACHs directly affect the cost levels and the quality of the services provided by the banks. While banks are the actual counterparts of services provided for enterprises and consumers it is the clearing houses that enable the successful sending and receiving of payment information between banks. While the demand side's point of view includes highly interesting and differing aspects from non-governmental organizations to multinational enterprise giants the analysis in this thesis will be limited to a more general level by dividing it to end consumers, merchants and enterprises.

The thesis is structured in a manner of conveying how the fragmented payments landscape in the EU and especially in the euro area will undergo the phenomena of SEPA and how this phenomenon will presumably eventually change the payments market. However, it is important to keep in mind that full migration to SEPA will most likely due to derogations be achieved only some time after 1st February 2014 in the euro area, and hence the market will at all likelihood continue evolving drastically also after this end-date. Therefore, the analysis presented in this thesis should be viewed to be more of an interim report of the final effects of SEPA. After the introduction to the topic and the relevant definition of retail payments to the economy are presented in sections 1 and 2, section 3 moves on to present SEPA thoroughly as the actual phenomenon cultivating the development from the "starting point" of a pre-SEPA fragmented payments landscape in the euro area.

The thesis moves on to present the relevant economic theory in section 4. This is followed by section 5 in which we intend to evaluate and compare the results obtained through the theoretical approach and contemplate those with the aims and results obtained from various other studies and economic assessments of the SEPA project thus far. Special attention in section 5 is given to the comparison between the current visible effects of SEPA and the expected benefits of SEPA on the individual demand and supply side stakeholders. While section 5 focuses more on the microeconomic effects, section 6, on the other hand, pulls together more of a macroeconomic level analysis. This is done by looking at the potential effects of SEPA on further financial integration of the European retail payments market through three separate but not necessarily independent indicators. Concluding remarks are presented in section 7.

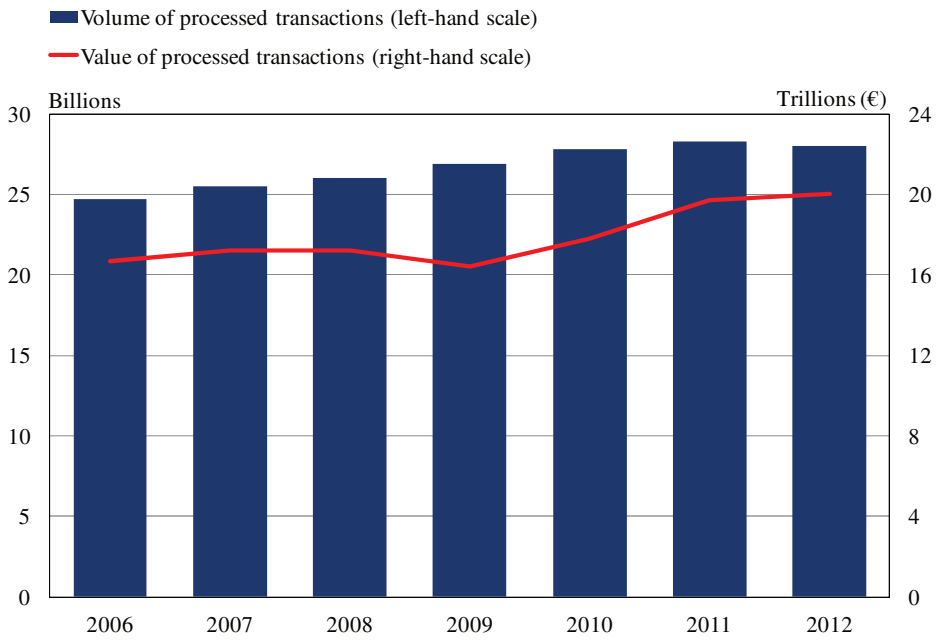
2. DEFINITION AND IMPORTANCE OF RETAIL PAYMENTS

The payment system infrastructure forms the backbone of the payment market which in turn serves the entire financial market through efficient, timely and secure ways of conducting payment transfers between any two parties involved. Kokkola (2010, 16) describes this to be of "fundamental importance for economic and financial activities and [] essential for the conduct of monetary policy and the maintenance of financial stability". Moreover, Hasan & al. (2012, 21) have even shown empirically the existence of a positive correlation between retail payments and economic growth in the EU-27 countries. Retail payment systems providing the infrastructure for the retail payment market in the EU are defined by the ECB (2013b) as systems handling mainly payments made by the public with relatively low value and of no time-criticality. BIS (2003, 6) summarizes the characteristics of retail payments more profoundly in the following manner:

1. "Retail payments are typically made in large numbers by large numbers of transactions and typically relate to purchase of goods and services in both the consumer and business sectors, rather than, for example to the settlement of transactions between financial institutions.
2. Retail payments are made using a much wider range of payment instruments than large value payments and in more varied contexts, including, for example payments made in person at a point of sale as well as for remote consumer and commercial transactions.
3. Retail payment markets are characterized by extensive use of private sector systems for the transaction process and clearing".

As emphasized by Kemppainen (2003, 24), the above definition captures the "complex and many faceted" nature of retail payments in general. In addition, the importance of retail payment systems is further evoked by looking at the volume and value of transactions processed in the euro area as presented in figure 1 below.

Figure 1: Volume and value of euro denominated retail payment transactions processed in the euro area 2006-2012.



Source: European Central Bank (2013b).

As can be observed from figure 1, the total value of euro denominated retail payment transactions was 20.00 trillion euro in 2012. This is over double the value of the euro area GDP in the same year. Both the volume and the value of processed payments grew by an annual average of 2.23 % and 3.29 %, respectively, between the years 2006 and 2012. Riksbank (2013, 55) highlights the size of the retail payments market as a fundamental driver for considerable revenue opportunities as well as the fact that the market is growing steadily unlike many other markets fluctuating in line with the economic cycle. With the trend observed in figure 1, this statement would appear to hold true relatively well for the euro area as well.

Another important aspect conveying the significance of the payment services provided in general in a payments market is the price of offering any such services. In an early study, Humphrey et al., (1997, 32) found that the costs of providing payment services in a country may add up to about 3% of GDP. Capgemini and European Commission (2008, 8) estimated that businesses, consumers and public entities in the EU-16 spent 1.3 % of GDP as non-cash payments costs in 2006. This equals to about 158 billion euro while costs of cash handling were reported to be around 1 % of GDP. Schmiedel et al. (2012, 43) further study the social costs of retail payment instruments and extrapolate it to be around 1% of GDP for the EU-27. However,

it must be taken into account that there have generally been substantial deviations in the efficiency of national payment markets and the relative payment habits between the various countries in the EU and the euro area. Nevertheless, the provided estimates contribute in explaining the significance of the retail payment market for the economy as a whole.

On top of the indisputable importance of the retail payment market for an economy and its relative size in relation to the euro area GDP, SEPA has resulted in the retail payment market receiving wide spread attention by all stakeholders during the past ten years. SEPA continuous to drive change and market reforms in the retail payment market in the EU and especially in the euro area, and will also potentially serve as the basis for future development even after the migration end date of 1st February 2014 for euro area countries and 1st January 2016 for all participants. As an outcome, the above mentioned reasons make SEPA an intriguing option for further studies in order to grasp the actual importance of this phenomena and its significance to the retail payment market.

3. CHARACTERISTICS OF THE SEPA PROJECT

3.1 Vision behind and the stakeholders involved

The Eurosystem as well as the European Commission (EC) have both originally noted the need for banks to develop their cross-border services without it resulting into any tangible improvements (Kokkola 2010, 188). Therefore, the European Parliament and the Council of the European Union adopted Regulation (EC) No 2560/2001 on equal charges for domestic and cross-border payments in euro on 19th December 2001. This was to improve cross-border credit transfer services by promoting efficiency and providing a more rapid, reliable and cheap way of conducting such transfers. The particular focus was on consumers and small and medium-sized enterprises (EC 2001).

The vision of SEPA perceived by the Commission and the ECB is "an integrated market for payment services which is subject to effective competition and where there is no distinction between cross-border and national payments within the euro area" thus calling "for the removal of all technical, legal and commercial barriers between the current national payment markets" (European Commission and European Central Bank 2006). The SEPA project was introduced in 2002 after the establishment of the European Payments Council (EPC) when 42 European banks, the three European Credit Sector Associations (ECSA's) and the Euro Banking Association (EBA) came together. This resulted in the publication of a White Paper which made the following declaration (European Payments Council 2007, 7.):

"We, the European banks and European Credit Sector Associations:

- share the common vision that Euroland payments are domestic payments,
- join forces to implement this vision for the benefit of European customers, industry and banks accordingly,
- launch our Single Payments Area"

The harmonization and standardization process aims at eventually enabling all citizens, companies, banks and other participants to conduct payments denoted in euro within the SEPA region with the same rights, obligations and conditions despite their location in the region. Through the use of common technical standards and business models as well as a common legal

basis and contractual frameworks, SEPA aims at creating a common set of payment instruments for all transactions concerning the single currency euro. This will also require efficient and competing clearing and settlement infrastructures satisfying user expectations that will be continuously amended and enhanced so as to ensure the further development of the system through market innovations. (European Central Bank 2013a.) Another important objective and aspect of the harmonization and standardization process according to Palva & Penttinen (2012, 97) will also be the fostering of competition in respect to a higher number of competitors and fewer niches, special fields, and other incompatibilities. The key stakeholders pushing and supporting the creation of SEPA are illustrated below in figure 2.

Figure 2: Main stakeholders in the creation of SEPA (Kokkola 2010, 188).

The political driver of the SEPA project is the EC having a critical role when it comes to the founding of the entire project. The passage of the Payment Services Directive (PSD) by the European Parliament and the EC is an essential step towards a consistent legal framework for payments hence introducing much improved certainty and clarity to the SEPA project. Under the coordination of the ECB, the Eurosystem has been responsible for setting up the objectives and the high level requirements for SEPA. The ECB is also monitoring EPC's progress with SEPA as well as coordinating the national implementation of the single payments area through national central banks. Consequently, national central banks are expected to draw together the banking industry, government and public authorities and users on a national level to safeguard the full implementation of SEPA. The EC, the ECB and the EPC are considered to be the co-owners of the SEPA project hence possessing the responsibility of the SEPA leadership. (European Payments Council 2007, 56-57.)

The main providers of the SEPA-project, on the other hand, include the EPC formed by the European banking industry, the European Automated Clearing House Association (EACHA) and the Cards Stakeholders Group (CSG). Each one of the providers has their own unique responsibilities and duties in the creation of SEPA compatible requirements, payment schemes and infrastructure. (European Central Bank 2013a.) In order for all the payment products and services to be fully exploited in SEPA a fully standardized infrastructure is needed. Henceforth, SEPA infrastructure refers to everything that makes SEPA payment products and services possible (Iivarinen & Ripatti 2010, 3). "A set of interbank rules, standards, and practices for the execution of euro payment instruments" is referred to as a SEPA scheme (European Payments Council 2007, 39).

The EPC acts as the decision making and coordinating body of the European banking industry with issues related to payments. It has a declared purpose of promoting and supporting the creation and development of the SEPA project. The EACHA, meanwhile, provides the infrastructure needed for the payment transactions and makes sure that the infrastructure complies with the rules defined by the EPC. The purpose of the CSG is to aid in achieving a consensus between the relevant sectors involved in the project concerning the formation of new standards. The users of SEPA, on the other hand, include all consumers, retailers, other small and medium-sized enterprises, large companies and public administrations. (European Central Bank 2013a.)

3.2 Payment instruments and new payment schemes

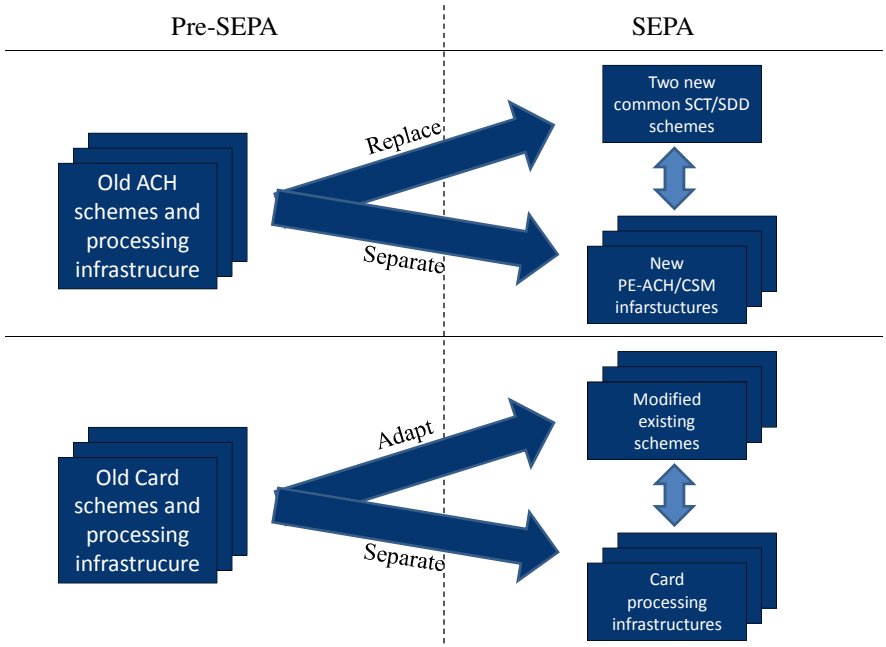
The shift away from the use of cash and checks as the primary means of payment towards more innovative and electronic payment instruments has been a long-term trend (Bolt & Schmiedel 2009, 5) which the implementation of SEPA will potentially further strengthen. The SEPA project is organized in three layers. The first layer consists of the processing infrastructure providing operational services for which the EPC has established a framework clarifying the roles and procedures for the clearing and settlement services. The second layer consists of the common SEPA schemes. (Kokkola 2010, 189.) New payment schemes have been developed by the EPC for credit transfers and direct debits while a SEPA compliant framework has been established for card payments. (European Central Bank 2013a.) The third layer comprises of the

new SEPA products and services offered on the basis of the core schemes to the end customers by the banks and service providers (Kokkola 2010, 190).

In order to ensure an optimal balance between competition and co-operation amongst banks with the two new payment schemes, three key features were identified during the design process: (i) the creation of a competitive processing infrastructure, (ii) enabling the creation of common interbank schemes and (iii) facilitating banks in offering their own products and services on the basis of competition to end customers. By using the core functionalities of the schemes as a basis, banks will potentially be able to provide a wide variety of payment services as they are free to add advanced practices on top of their current payment services and products. In SEPA, banks are to be able to compete for clients and develop their products and services for markets also outside their previous regional home markets thanks to the common business rules and standards adopted. The separation of processing infrastructures from the schemes, meanwhile, enables the conduction of non-cash payments through various optional Clearing and Settlement Mechanisms (CSM) hence braking down national monopolies and allowing banks to choose their CSM based on the price and service levels. (European Payments Council 2007, 40-43.)

Focus in the SEPA project has been put on the three most used non-cash payment instruments: credit transfers, direct debits and card payments. This has resulted in the SEPA project coming along with two new payment schemes: SEPA Credit Transfer (SCT) and SEPA Direct Debit (SDD). The creation of both schemes by the EPC was based on knowledge and data gathered from banks' day to day contact with customers. The schemes are designed to provide core features to customers, banks and infrastructure providers drawn from this information. A completely different methodology was adopted in the design of the two new payment schemes in comparison to card payments. The new payment schemes are to replace the old ones completely while the new card scheme is a modification of the previous versions. (European Payments Council 2007, 39.) This is further illustrated in figure 3 below.

Figure 3: SEPA Schemes and Cards Framework Design Philosophy (European Payments Council 2007, 40).



Both, the SCT and the SDD, are referred to as interbank payment schemes since the schemes define the maximum processing time frame as well as the common service level that banks must adhere to. The SDD scheme actually consists of two new schemes: the core scheme and a business-to-business (B2B) direct debit scheme. The latter scheme is based on the former one. However, the B2B scheme includes certain specific features for payments between businesses and it is optional for banks to offer services related to it. (European Central Bank 2013a.) The PSD improves the end users position by limiting the settlement time for euro denominated credit transfers to one business day within the entire EU starting 2012 onwards. Payments are also to be made in full irrespective of where the receiver is located within SEPA and both the payer and the payee are primarily responsible for fees charged by their respective service providers. (Iivarinen & Ripatti 2010, 13-14). No additional fees are to be charged on top of these for transfers within SEPA.

Payment cards have become indispensable in most advanced economies today. They have become the most used non-cash payment instrument in Europe and they have been proven to be a more simple, safe and cost-efficient option when compared to cash. The increased use of debit cards has also resulted in a decreased demand for small-denomination bank notes and coins.

(Bolt & Schmiedel 2009, 5.) The differing approaches of national card schemes, the existence of the International Card Scheme (ICS) and the complexity of the card business itself resulted in the EPC issuing a SEPA Cards Framework (SCF) policy document instead of developing a completely new scheme as had been with credit transfers and direct debits. This SCF document states how card issuers and acquirers as well as card schemes and operators must adapt their current operations in order to fully comply with the SEPA principles concerning card payments denoted in euro. (European Payments Council 2007, 47.)

3.3 Standardization and technical requirements

The importance of the data format used to exchange information between banks in payments processing can be analogously compared to the importance of language in communication between people. SEPA sets out to replace the dozens of different data formats previously used in the EU and also inside the euro area through an agreement on a common set of data to be exchanged in a common syntax. The EPC has specified SEPA data formats for the exchange of SDDs and SCTs and they are detailed in the respective SEPA implementation guidelines. (European Payments Council 2013.) The regulation (EC) 260/2012 requires the use of ISO 20022 XML (eXtensible Markup Language) message standard as well as the use of the International Bank Account Number (IBAN) and the Bank Identifier Code (BIC) for all direct debits and credit transfers denominated in euro.

The ISO 20022 standards are not exclusive European standards but are instead based on the global ISO 20022 message standards developed by the International Organization for Standardization (ISO)[1]. Through the empowering of a wide range of stakeholders, each of them expressing their interests in a common work product, as well as complete transparency of the process, the ISO 20022 is aimed at creating a level playing field hence averting a situation in which several standards are simultaneously developed to address the same business needs materializing in different areas and domains internationally. The global nature of the financial services industry is reflected in the standard by bringing together various financial and commercial needs. Automation, openness, cost-efficiency and the ease of implementation are

[1] ISO (Greek for isos, meaning equal) is a Swiss based organization founded in 1947. It is the "world's largest developer of voluntary international standards" with "state of the art specifications for products, services and goods practice, helping to make industry more efficient and effective". (http://www.iso.org/iso/home/about.htm, entered 11.9.2013).

supposedly promoted by the model evolving through business and the message formats evolving through technology in order to benefit from the latest innovations. Therefore, the ISO 20022 package offers presumably the fastest and the most efficient way of developing and implementing message standards serving as the basis for long-term financial service solutions. The ISO 20022 enables the development of message standards for all domains of the financial industry and can thus be considered to be "a standard to develop standards". (European Payments Council 2013.)

The IBAN and the BIC are technical standards developed by the ISO just like the ISO 20022 XML message format. Their purpose is to allow the identification of any account across SEPA in the 33 countries involved in the project and they will replace the former national bank account identifiers thus creating a wide reachability. This will enable any customer to be reached by a credit transfer and as well as it will enable direct debits to be made in favor of any recipient within the SEPA region. (European Payments Council 2013.) The IBAN enables banks to route their cross-border transactions automatically across specific countries and provides an interface for the procedures used for domestic payments. (European Central Bank 1999, 10.) The IBAN will replace the Basic Bank Account Number (BBAN) for all domestic national payments 1st February 2014. Likewise, Payment Service Users (PSU) are no longer required to use the BIC of a Payment Service Provider (PSP) of a payer in the case of a SDD or of the PSP of a payee in the case of a SCT after the 2014 deadline for national or cross-border payments. However, EU member states may choose to defer this until the 2016 deadline. In any case, the IBAN will be the sole account identifier after the 1st February 2016 deadline. (European Payments Council 2013.)

In relation to the objectives of SEPA on cards, they will be achieved "through the use of harmonized, interoperable and free standards openly available to all parties within the card payment value chain". A safer, secure, more cost-efficient and a functionally richer card services environment is the focus of the CSG especially aiming at technical obstacles currently preventing an extensive customer payment card experience across SEPA. The SEPA Cards Standardization Volume – Book of Requirements defines the standard set for requirements ensuring an interoperable card and terminal infrastructure formed on the basis of open and free standards. (European Payments Council 2013.)

3.4 Timeline and implementation

The European financial market has been gradually moving towards a higher level of integration ever since the establishment of the European Economic Community (EEC) in 1958. This eventually led into further integration of the European market for goods and services by the introduction of the EMU and eventually the single currency euro in 1999 and the actual cash changeover in January, 2002. Meanwhile, the creation of a common payment network for large value payments, the Trans-European Automated Real-time Gross settlement Express Transfer (TARGET) system, in 1999 enabled the implementation of European monetary policy. The network was used for safe and fast transactions of large value payments that are imperative for the stability of the financial system. (Snellman 2004, 152.) The system was updated to TARGET2 starting November 2007 and currently acts as an "essential building block for settlement of SEPA payments and other euro payments" (European Payments Council 2007, 57).

Despite the advances made concerning the payments network for large value payments denoted in euro, a unified retail payment network in Europe has not existed before the SEPA project. National and cross-border low value payments have continued to be handled in various different manners depending on the local payment system. This resulted in an observable difference between the fees charged by banks concerning different forms of transactions, cross-border transaction fees being relatively high throughout the entire EU. The regulation (EC) No 2560/2001 banned the possibility of charging higher fees for cross-border than domestic euro payments with credit transfers and payment cards hence resulting in the creation of the EPC by the banking industry in 2002 to address the payments issue. This, in turn, eventually led to the launching of the SEPA project. (European Central Bank 2013a.)

The timeline for the migration from the old national payment and settlement schemes to full compatibility of SEPA has been divided into three separate phases: design phase, implementation phase and migration phase (European Central Bank 2013a). Priority implementation focus has been put on the euro-area countries as SEPA has the potential to revolutionize their retail payment markets the most. EU countries joining the euro are expected to go through a similar process and all non euro area countries have to participate in SEPA for euro payments as well. They may also choose to adopt SEPA standards for payments in their

national currencies. (European Payments Council 2007, 53.) The key dates related to the SEPA project are summarized in Table 1.

19 December 2001	Regulation (EC) No 2560/2001 entered into force.
June 2002	EPC is established.
13 November 2007	PSD is adopted as the legal basis for retail payments in Europe.
January 2008	SCT scheme is launched.
1 November 2009	Regulation (EC) No 924/2009 repeals regulation (EC) No 2560/2001.
November 2009	SDD scheme is launched (core scheme and B2B).
14 March 2012	Regulation (EU) No 260/2012 establishes technical and business requirements for credit transfers and direct debits in euro amending Regulation (EC) No 924/2009. SEPA end-date regulation.
1 February 2014	Deadline for migration to SCT and SDD within the euro area.
1 February 2016	Transitional arrangements end date (BIC requirements for cross-border payments and migration of national niche products).
31 October 2016	Deadline for non-euro are countries to migrate euro-denominated payments to SCT and SDD.

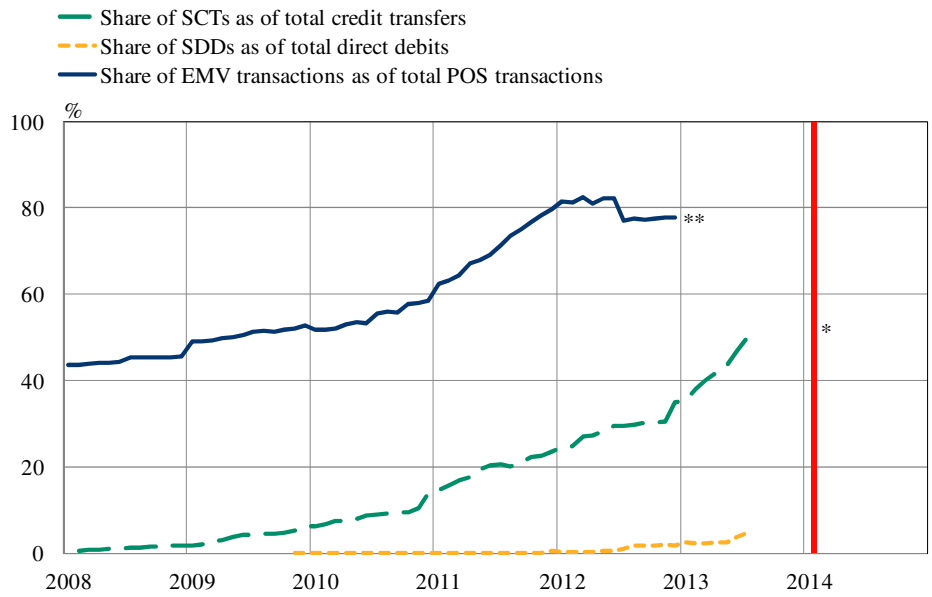
Table 1: Major milestones and key dates related to SEPA.

During the design phase between January 2004 and June 2006 the EPC designed the rules and practices for the new payment schemes and selected the standards that were to be applied. This meant the design of the Cards framework and the new SCT and SDD payment instruments. The implementation phase began after the design phase and lasted until January 2008. During the implementation phase the new SEPA products were created and tested by the banks and preparations for the new instruments were made on a national level. The set up of national implementation and migration bodies by each participating country occurred during this phase as well as the adoption of the PSD as the legal basis for SEPA. From January 2008 until today the participating countries of SEPA have been under the migration phase during which both the providers as well as the users of the new payment services are to gradually move to full SEPA

compatibility. As a part of this phase, the SCT scheme was launched in January 2008 and both SDD schemes were launched in November 2009. (European Central Bank 2013a.)

Despite, or maybe thereof, the magnitude of the SEPA project and the additional costs incurred especially by the banking sector for enabling a co-existence of several large scale payment systems simultaneously, no clear end-date was set for the SEPA project in the beginning. Implementing an official end date for the migration phase was deemed as necessary in many countries (Iivarinen & Ripatti 2010, 9) since it was observed that procrastination might result in a costly time period in which the banking sector is not able to reap the full benefits of the standardized system. Nevertheless, a clear end-date regulation was set only in March 2012, when Regulation (EU) No 260/2012 was published. According to this regulation, the end-date for replacing national credit transfers and direct debits for SCTs and SDDs will be 1st February 2014 for all euro-area countries. The final deadline for non euro-area countries to complete full migration into SCT and SDD for euro-denominated payments will be 31st October 2016. Figure 4 illustrates the progress of the migration process achieved by the euro area countries in relation to the 1st February 2014 end-date.

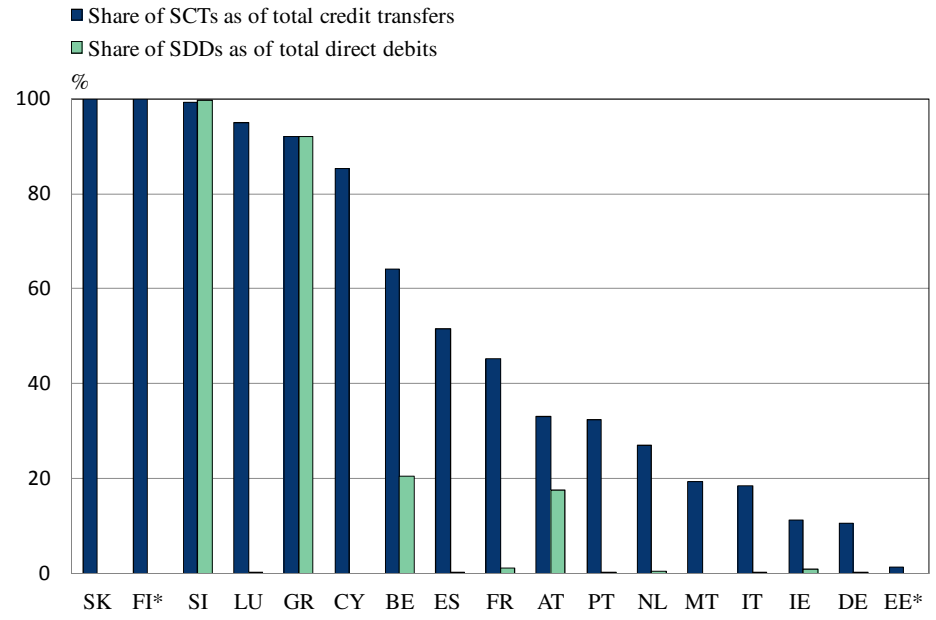
Figure 4: Indicators of the SEPA migration process as of July 2013.



* SEPA migration end date
** Data available only until end of 2012
Source: European Central Bank (17.9.2013)

The ECB (2013a) uses the share of EMV transactions[2] of total POS transactions as an indicator[3] to follow the SEPA compliance for cards. The share of EMV transactions is used as, by definition, non-EMV transactions are not SEPA-compliant. Despite the approaching migration end-date covering SCTs and SDDs, SEPA compatibility is still far from complete. As can be observed from figure 4, full scale migration is still very much on its way when considering SDDs while about 40 percent of credit transfers are currently executed as SCTs. The state of migration between different countries is further illustrated in figure 5.

Figure 5: Migration to SCT and SDD per country at the end of Q2 2013.



* Legacy direct debit swill mainly be replaced by e-ivoicing in Finland and Estonia.
Source: European Central Bank (18.9.2013)

As can be observed, actual migration is not taking place in a uniform manner across countries. Vast differences exist between the participating nations. The ECB (2013d, 91) is paying close attention to the migration process and is urging for additional actions to be taken despite "all the efforts made so far by public authorities, the financial industry, individual end-users and end-user groups". According to the ECB (2013d, 91) a key role will be played by communication in order to ensure a successful migration.

[2] EMV-compliant card used at an EMV-compliant terminal with EMV technology used in processing the transaction.
[3] Other indicators include EMV-compliant ATMs and POS terminals. However, as an indicator they include the same caveats as with the indicator of the share of EMV transactions of total POS transactions.

4. THEORETICAL APPROACH TO PAYMENT SYSTEMS

4.1 Literature review

Schaefer (2008, 3) has underlined the absence of any systematic analyses on SEPA and points out that theoretical and empirical assessments of the various channels for enhancing welfare and the possibility of market failures are largely missing. Kemppainen (2008, 7) also stresses the non-existence of analytical studies on the potentially far-reaching effects of SEPA. As pointed out by these two papers, no common economic theory exists to analyze SEPA and wider systematic analyses on the topic as well as theoretical and empirical assessments of the various channels for enhancing welfare and the possibility of market failures are relatively scarce[4]. This may partially be due to the extent and many-faceted nature of the SEPA project hence making it difficult for example to contemplate the particular characteristics of two-sidedness especially in card systems into a more general context of the entire payment network including the various retail payment instruments and the effects on all the possible stakeholders involved. However, payment markets are in general considered to be a network industry and a comparison to the telecommunications industry is often used to depict the special characteristics inherent in such an industry.

An early description of the modern payment system is provided by Summers (1994). A range of policy issues as well as issues in practical implementation arising in the design, management and supervision of payment systems in a market economy are discussed, while providing the fundamental basics of how payment systems function in a western developed economy. This discussion was inspired by the need of assistance in introducing former Soviet Union and Baltic countries successfully into a market economy in which the existence of an efficient and safe payment system plays an important part. Kokkola (2010) provides a more recent and up to date comprehensive description about how transactions involving money and financial instruments such as securities and derivatives are handled in the economy. Focus is dedicated with a special attention on the EU and market infrastructure for payments and financial instruments. Kokkola

[4] The *Theory of Optimum Currency Areas* (OCA) by Robert Mundell (1961) captures the optimal characteristics for the merger of currencies or the creation of a new currency thus maximizing economic efficiency over a geographical region. While SEPA potentially further enhances the positive effects implied by increased labor mobility and openness of the economy inside a certain geographical region such as the euro zone, the theory itself is ill suited for analyzing the full spectrum of effects that SEPA aims at achieving.

underlines this to be one of the three core components of the financial system, the two other being markets and institutions.

A more analytical aspect in relation to payment systems is taken by Berger, Hancock & Marquardt (1996) by implementing a simple risk-cost frontier framework for analyzing payment system efficiency, risks and innovations. By covering the areas of risks in large value transfer systems, interplay among payment instruments, the adoption of new payment technologies and the efficiency of payment system intermediaries, the authors emphasize the trade-off between risks and costs faced by payers, payees, intermediaries and regulators. They also model changes to the payment system through three different, but not necessarily independent, types of innovation: technological, financial and regulatory. Khiaonarong (2003) builds on the same risk-cost framework and examines how costs are incurred and recovered in pursuing payment system efficiency under alternative policy approaches. Key findings and aspects taken in the study include the existence of strong scale economies in payment services, policy approach discussions in relation to payment system ownership and the importance of both financial and technological innovations as policy tools for central banks.

The network nature of payment systems is to a large extent based on the fundamental works of Katz & Shapiro (1985) related to network externalities, competition and compatibility as well as on Economides (1996) in relation to the basic structure of networks. Guibourg (1998) asserts the economies of scale on the cost side as well as the economies of scale on the demand side, namely "network externalities", in her application of network economics to payment systems. Kemppainen (2003), on the other hand, covers the network effects and the special characteristics apparent in the provision of payment services and provides an analysis of the interaction between the competition-cooperation nexus and regulation in payment system. Kemppainen & Salo (2006) further built on the same analysis in contemplating the fundamental role of a payment system regulator in creating a level playing field for different service providers as well as compatibility and interoperability in the form of standards as a prerequisite for payment system efficiency. Moreover, they examine the latest developments in the European retail payment systems, that is to say, the process of building SEPA.

An economic research perspective of the SEPA project is also provided by two contemporaneous and complementary works by Schaefer (2008) and Kemppainen (2008) which have both applied the linear Hotelling model of consumer choice to analyze the effects of

SEPA. However, the approach in both papers differs to some extent from each other. Kemppainen (2008) focuses on the interpretation of the model on the SEPA-effects in national debit card markets with particular emphasis on the demand side by introducing an expansion of positive network effects portraying a segmented retail payments market as a starting point. Schaefer (2008), on the other hand, builds on the cost issues of the supply side focusing on one country and fully-covered markets. In addition, Hunt, Simojoki & Takalo (2007) have focused in their work on the growing importance of patents in electronic payment systems thus addressing the significance of a standard-setting arrangement as well as the ownership and licensing of essential intellectual property. By using examples from the European mobile telephony and financial patenting in the United States, the authors present potential risks arising for the participants in SEPA.

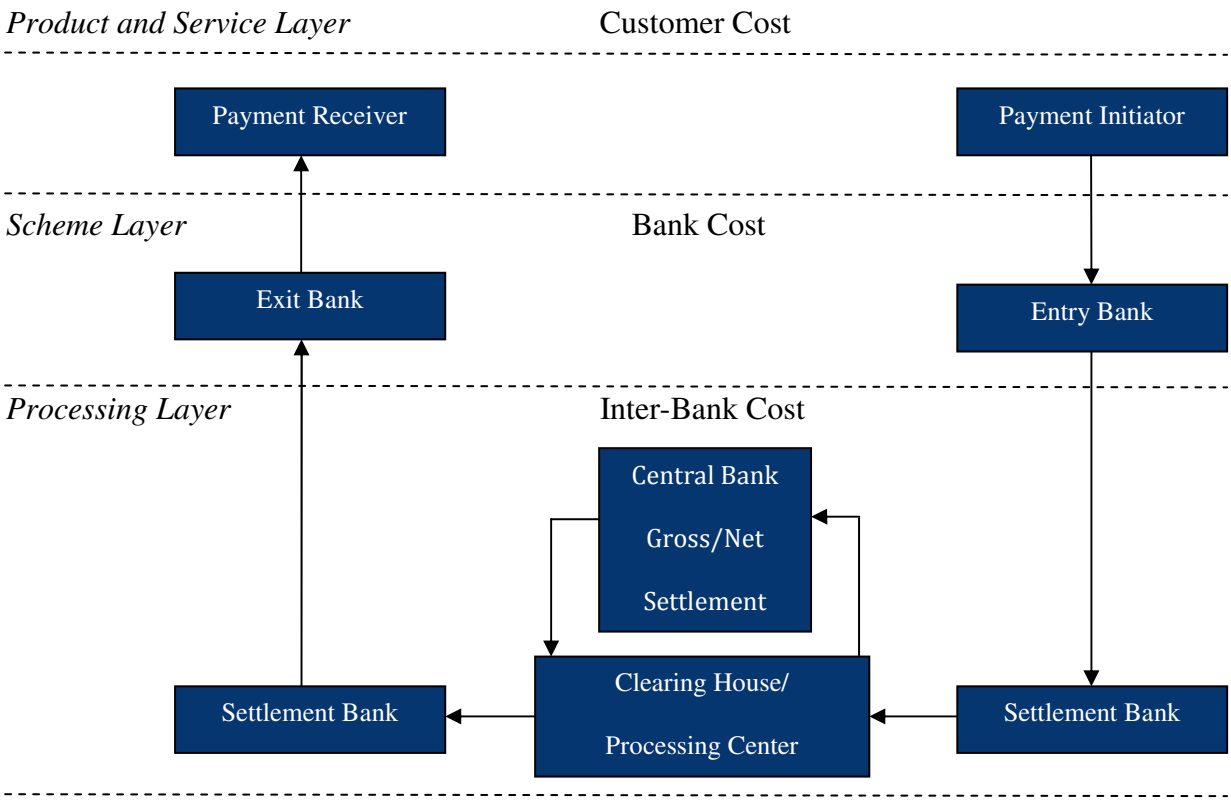
This thesis aims at drawing together an overall theoretical framework based on earlier works by which the SEPA project could be analyzed in relation to the risks and potential efficiencies associated with it. Our intention is to analyze the effects of SEPA through the potential economies of scale and network effects thus potentially achievable through SEPA on a pan-European scale hence also promoting further financial integration within Europe. The analysis will focus on the effects of SEPA standards on all market participants having to abide to them instead of possible advantageous and disadvantageous outcomes between the various market participants resulting from a standards war[5]. In addition, a somewhat alternative approach will be taken in relation to general economic theory in line with the Berger et al. (1996, 698) who point out that "most models of real activity treat the risks and costs associated with payments as negligible transaction costs". Through the use of a risk-cost trade-off as well as the implementation of network industry characteristics in payment systems we aim at discussing how standardization will potentially play a key role in connection with efficiency and the future market structure of retail payment markets in SEPA.

[5] See for example "First-Mover Advantages", Strategic Management Journal, Volume 9, 41-58, Summer 1998 by Marvin B. Lieberman and David. B. Montgomery. Despite the framework of first-mover (dis)advantage not being relevant for analyzing the effects of SEPA migration, the theory would appear to be relevant and applicable when looking at future innovations in the retail payment market on top of the SEPA standards. However, further analysis on this matter is outside the scope of this thesis.

4.2 Overview of an account-based payment system

Payment systems are provided by banks and other financial institutions for domestic and international fund transfers from one party to another instead of using physical cash in exchange when conducting a sale of any good or service. The purpose of different payment systems is hence to make a transaction between two or more parties more efficient, less time consuming and cheaper. Figure 6 provides a general illustration of the payment cycle. It also portrays the different layers already presented in sub-section 3.2 in relation to how the SEPA project is organized as well as the involvement of the five various parties included in an account-based payment (Kemppainen 2003, 26). The scheme and the processing layers will be distinctly separated from each other in SEPA as presented before in figure 3 thus creating a distinct separation in the ownership between these layers. In this manner, national monopolies will give way to competition between the various CSMs.

Figure 6: Payment cycle (Khiaonarong 2003, 9; Kokkola 2010, 189).



Three distinct steps are identified during the processing of a payment in the payment cycle: initiation, clearing and settlement. Initiation occurs when an instruction is sent either to the payer's or the payee's account-operating institute depending on the payment instrument used. The initiation is verified (verifying identities of parties involved, ensuring sufficient funds) and authorized after which the account is debited and the information is sent on to clearing. A clearing organization compiles the information and instructions related to the actual flow of funds after which the clearing house then instructs a settlement institution in which the account-operating institute has accounts to transfer the instructed amount. This communication of payment information requires the application of standards between the account-operating institutes, clearing institutions and the settlement system. (Riksbank 2013, 26-27.)

Costs induced in a payments cycle illustrated in figure 6 can be divided on a more general level into real resource and financial costs. The real resource costs include costs related to development, production and processing while the financial costs include costs related to float, opportunity cost for holding idle funds and liquidity costs that may be required with the posting of collateral to reduce risk in the settlement system. To be more exact, development costs relate to the initial investment and setting up costs in a payments system including possible upgrades and enhancements of the system. Production costs meanwhile relate to the production of a payments instrument before its use (e.g. producing notes and coins, cheques, credit and debit cards, etc.) and processing costs relate to costs associated with labor, accounting, mailing and transportation. (Khiaonarong 2003, 9.)

Each one of the cost types illustrated in figure 6 can be divided into real resource and financial costs. Out of the three cost types presented, customer costs are probably the most visible. These costs include costs related to writing cheques, printing, computer hardware and software, bank statement enquiries, etc. (Khiaonarong 2003, 9.) Banks generally develop, produce and process payment instruments and services on their own and hence bank costs relate to the bank and intra-bank levels. Inter-bank costs arise from the payment clearing and settlement costs. The settlement of any payments are generally carried out under accounts maintained by the central banks but the actual clearing houses themselves can be operating on either a public or a private basis[6]. The financial cost of the settlement process depends on whether the settlement is conducted on a gross or on a net settlement basis. However, there is also a possibility of not

[6] An example of a privately operated pan-European ACH would be the STEP2 system run by EBA Clearing. The actual settlement takes place in the Eurosystem's large value payment system: TARGET2.

operating through a centralized clearing house in the first place at all, which would result in reduced centralized operating costs. This would mean that the payment participants send bilateral payment instructions to each other and the settlement is made directly at the central bank[7]. (Khiaonarong, 2003, 10.)

The interbank funds transfer system is the main source of interbank costs including the real resource costs in any banks operation. These costs play a major role in the whole payments cycle due to their possible transferability onwards to the bank and customer levels. The pricing policies of central banks and other service providers have an impact on determining the bank cost, the customer cost and also the payment system efficiency. Partial subsidization or full cost recovery are both examples of pricing policies by central banks and other similar service providers on the grounds of social welfare or of a "cost push" strategy to industry. (Khiaonarong 2003, 10.) However, the bundling and cross-subsidization of payment services may also distort relative prices hence encouraging consumers to use less cost-efficient alternatives. This may result in a deviation from the socially optimal outcome as services are not priced based on the true costs behind them. (Kokkola 2010, 138.)

4.3 Risk-cost trade-off framework

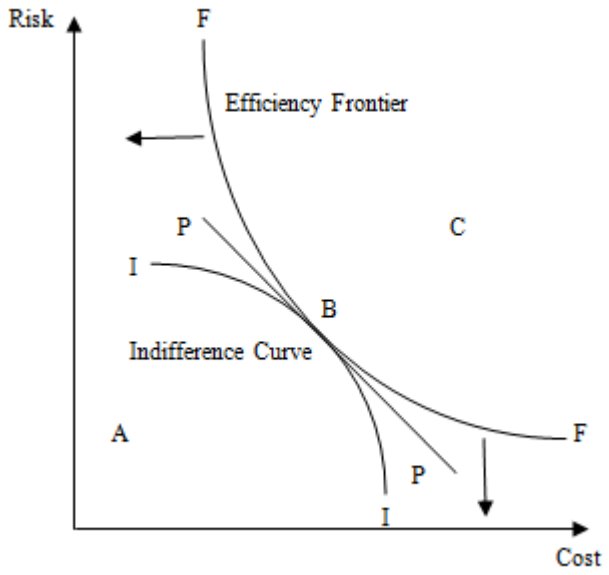
4.3.1 Aspects of payment system efficiency

Payment system efficiency can be analyzed from two distinct perspectives: technological and economic efficiency. The adoption of more advanced computer and communication technology in order to improve the operational performance in payments processing and settlement is related to technological efficiency. The management of resources as well as their allocation in the actual operation itself to produce optimal prices in providing payment and settlement services is correspondingly related to economic efficiency. Technological efficiency can be seen as the means of achieving economic efficiency as a technologically efficient system does not by itself guarantee an economically efficient one. Nevertheless, it may have an impact on competition and governance as well. Improvements in both types of efficiencies result in an overall improvement in the efficiency of a payment system. (Khiaonarong 2003, 10.)

[7] An example of such a system would be the Finnish PMJ system in which the final settlement takes place in TARGET2.

In order to better understand and explain the efficiency of a payments system, a risk-cost frontier framework is adopted as a suitable approach[8]. The framework is based on analyzing the efficiency of a payment system in terms of the risks and costs it absorbs along the efficiency frontier and especially on how innovations in terms of efficiency improvement may shift the efficiency frontier. (Khiaonarong 2003, 13.) The framework is illustrated in figure 7 below. The risks and costs measured are actually deviations from the standard assumptions of economic and financial models according to which transaction costs in payment systems are negligible. Therefore, figure 7 measures risks and costs relative to an ideal "frictionless payment system" in which all payments are costless, riskless and instantaneous. (Berger et al. 1996, 701.)

Figure 7: The risk-cost frontier framework (Khiaonarong 2003, 14; Berger et al. 1996, 700).



The curve FF in figure 7 represents the efficiency frontier which shows the possible combinations of a risk-cost tradeoff. The marginal cost of a reduction in risk increases as the risk decreases (moving toward the horizontal axis). This assumption of diminishing marginal returns is reflected by the convex shape of the curve. (Berger et al.1996, 700.) In other words, a lower risk in the payment system comes with a higher cost as well as a higher risk results in

[8] Despite a number of important differences, the risk-cost framework is analogously somewhat familiar to the Capital Asset Pricing Model (CAPM) in which a similar simple trade-off between risks and expected returns is employed (Berger 1996, 700).

lower costs. The curve II represents the indifference curve of the society and shows how it prefers low-risk and low-cost payment services. (Khiaonarong 2003, 14-15.) The assumption of diminishing marginal utility from risk reduction is reflected through the concave shape of the curve: the society would be willing to pay increasingly less to remove marginal risks as the actual risk decreases (toward the horizontal axis). (Berger et al. 1996, 702.)

The rate by which risks and costs are traded off at the optimum is shown by the tangent price line PP. At point B, the marginal rate of transformation between risks and costs equals the marginal rate of substitution hence yielding a Pareto optimal outcome. (Berger et al. 1996, 702.) Therefore, social welfare is maximized where the indifference curve and the efficient frontier curve are tangent to each other. With technological improvements point A could be reached as new payment services would enable a lower risk with a lower cost. Point C, on the other hand, would represent an inefficient solution in which the payment system would have high costs and a high risk. (Khiaonarong 2003, 15.)

The points on the efficiency frontier can be shifted by three distinct types of innovations: technological, regulatory and financial innovations. Technological innovation is any new payment service that has a cost-saving potential in it. Regulatory innovations relate to changes in laws, regulations or supervision hence resulting in improved oversight of the payment system. Financial innovations may include anything that enables a better evaluation technique for monitoring risks. (Khiaonarong 2003, 15.) Even so, technological improvements may come with a high cost for example through required initial investment costs, liquidity costs and operating costs. This may hammer economic efficiency that focuses on cost recovery and pricing of payment services. (Khiaonarong 2003, 11.)

4.3.2 Supply side economies of scale and scope

Scale economies play a key role when it comes to achieving economic efficiency in payment operations. These scale economies result from the realization of cost reductions in the average cost or costs per unit as transaction volumes increase. In a similar fashion, scale diseconomies occur from the realization of a cost increase in the average cost or costs per unit as transaction volumes increase. (Khiaonarong 2003, 11.) An example of economies of scale in relation to financial costs is the need for settlement funds in clearing systems which do not rise as fast as

the value of payments processed and hence costs decline with the number of participants. In multilateral netting systems, in which payment obligations are offset between participants so that only one payment obligation or claim per participant remains, generally "reduce the need for settlement liquidity by between 50 and 90 percent" (Guibourg 1998, 9).

Economies of scope, on the other hand, refer to efficiency that is more related with the demand side changes of different products and services. This refers to synergies between products by which the overall efficiency of production may increase as the total number of products increases. The consumer benefits more from a wider range of products being offered rather than just a single product. In other words, if the total output of a single firm in producing two different products is greater than that of the output of two separate firms, economies of scope can be said to be present. (Kokkola 2010, 134.) Economies of scope is hence an important aspect denoting the possibility of allowing fixed costs to be spread out over a wider range of output when a payment system handles more than just one type of a transaction (Khiaonarong 2003, 11).

Figure 8 below is used to better illustrate the relationship between costs and volumes along the efficiency frontier curve presented in figure 7 before. Cost-volume combinations are compared on three different levels: scale, scope and efficiency effects. "The efficiency effect occurs in payment systems that have the lowest average cost. This is also known as the "frontier" of best practice payment systems. (Khiaonarong 2003, 16.) The high capital-intensity in payment systems makes size and scalability important. The requirement of significant initial investments in processing infrastructure, extremely secure telecommunication facilities as well as data storage and applying complex operational standards and protocols result in high fixed costs for the PSPs. (Beijnen & Bolt 2007, 6.)

Figure 8: Scale-scope effects on the efficiency frontier (Khiaonarong 2003, 16).

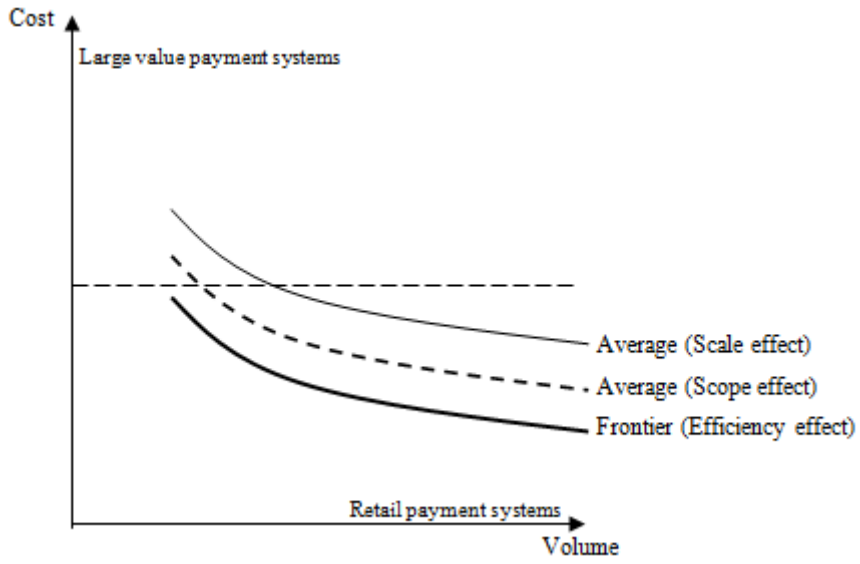


Figure 8 is divided into large value and retail payment parts as payment systems operate in these two regions. High-value but low-volume transactions are handled by the Large Value Payment Systems (LVPS) while low-value but high-volume transactions are handled by the Retail Payment Systems (RPS). The interbank funds transfer and settlement services can best be illustrated as an LVPS while clearing houses processing cheques and automated direct and credit transfer instructions belong to the RPS. However, the distinction between these two payment systems is not self-evident as some LVPSs may handle low-value transaction to some extent as well. A higher overall unit cost can be observed in the LVPSs in comparison to the RPS owing to comparatively higher real resource costs associated in investment and operation functions as well as higher financial costs in terms of liquidity costs. (Khiaonarong 2003, 16.)

4.4 Network industry approach

4.4.1 Payment systems as a network

Standards harmonize communication protocols used for transmission by enabling compatible and interoperable processes between different business entities. Network effects[9] are the underlying mechanism driving these benefits. (Palva & Penttinen 2012, 96.) This concept of a network effect is of importance in economics and can be extended to apply for payment systems on a more general basis in the same manner as for example with the telecommunications industry. The focus of network economies is on the strategic interaction between firms and its impact on consumers' choices when it comes to products and services. (Kokkola 2010, 131.) Economides (1996, 674) describes networks as composed of links that connect nodes and that "it is inherent in the structure of a network that many components of a network are required for the provision of a typical service". This idea is also evoked in relation to payment systems when looking at figure 6 before. Hence, it can be argued that retail payment systems are a network market in which the network effects play a major role in how the management of resources as well as their allocation is determined. This also adds more insight into the concept of economic efficiency presented earlier.

The network nature of payment systems is captured through the network effect and the competition effect. In order to create network effects, cooperation among PSPs is needed enabling the establishment of common standards and infrastructures thus acquiring a wide enough customer base. Common standards, on the other hand, increase competition among the PSPs and may hence act as a disincentive for increased compatibility. This is referred to as the competition effect. (Kemppainen 2003, 19.) Therefore, market failure may occur when the coordination problems among a large number of participants prevent large capital expenditure or the setting up of industry-wide standards hence also "inhibiting long-run growth and the development of modern and innovative payment solutions" (Bolt 2013, 75). As Kemppainen (2003, 19) points out, this is the case argued also by the ECB (2001, 4) in relation to cross-border credit transfers: "the lack of competition among banks [] explains the lack of progress with regard to the price level [], whereas a lack of cooperation on standards and infrastructure explains the lack of progress in reducing the cost of processing" such transfers.

[9] The terms "network effects" and "network externalities" are used interchangeably throughout the thesis.

Finally, the network quality and the vertical structure inherent to the retail payments market is evoked by Kemppainen (2003, 34) by stating the market to include "upstream cooperation combined with downstream competition". This refers to the desirable "advantage of economies of scale by means of cooperation between market players" while simultaneously posing a risk of such arrangements ending up to be anti-competitive in nature. Collusive behavior on one level may result from cooperation on another hence pointing out a trade-off between competition and cooperation. Nevertheless, Kemppainen (2003, 49) emphasizes this competition-cooperation nexus to have special importance in retail payment systems as a certain degree of competition needs to exist in order for the customers' requirements to be met regarding the provision of more access and destination points in a system.

4.4.2 Characteristics of a network industry

Complementarity and compatibility

Complementarities between users and/or products give rise to network externalities in network markets (Kemppainen & Salo 2006, 65). This implies an increase in the value of any network used by its participants as an additional participant joins the same network. Conversely, individuals are also more willing to pay for any such network service when new participants join. This is what is referred to as a network effect. As more consumers join a certain payment system by which to conduct their payment transfers, other consumers already using the specific network benefit indirectly from this and experience a positive network externality since the number of counterparties grows for all participants. (Kokkola 2010, 131.)

The card payments industry serves as an illustrative example of complementarity where merchants and consumers are both users of card transaction. The decision made by consumers about whether or not to join a card scheme is based to a certain extent on the number of merchants accepting the card in question. Likewise, merchants make their decision on whether or not to join a certain card scheme based on the number of consumers using it for payment. This would indicate that the benefit for each group of users depends on the economies of scale as "the value of joining a card scheme depends on the expectations regarding the size of the network on the opposite side of the market". (Kokkola 2010, 139.)

Complementarity by itself does not guarantee the exploitation of network externalities but instead requires the existence of an "interaction channel" in order for the products, services, users or systems to interact. Therefore, the concept of compatibility is of essence thus referring to a product or a system operating on the same and compatible standards. (Kemppainen & Salo 2006, 65.) "It is compatibility that makes complementarity actual" (Economides 1996, 676) and in principle this can be achieved by the adoption of common technical standards. "Commercial compatibility" is required in addition to "technical compatibility" in order to ensure full interoperability of systems. Otherwise, compatibility can be limited through various manners including exclusive rights, operating rules or entry requirements. (Kemppainen & Salo 2006, 65.)

Despite the positive externalities enabled through complementarity and compatibility, they may also give rise to negative externalities as the network expands. Kokkola (2010, 155) points out an example of a possible negative externality arising in payment systems through liquidity problems. Participants in a payments system are generally dependent on each other to a certain extent and possible disruptions caused by one participant may cause additional disruptions in multiple counterparties. Such a form of negative externality may eventually even lead to "financial contagion" spreading across the entire network. (Kokkola 2010, 155.) Strong network externalities in payment systems exist in the provision of payment services as millions of payers, payees, financial institutions and operators are required to connect to each other. This may give rise to inefficiencies through the misalignment of incentives and thus result in a market failure (Bolt 2013, 75).

Two-sided markets

Network effects are especially apparent in two-sided markets in which "the presence of two (or more) groups of end users enable interaction between those groups, and producers try to get those two (or more) sides on board by setting prices appropriately". These two or more distinct groups present at the market consequently add to the network benefit of each other and generally consistently play the same role. Hence it is important to realize that network externalities for a user group depends on the consumption by different but compatible users on opposite sides of the two-sided markets. (Kokkola 2010, 139.) This is not only true for the card payments market through the example given above but also for the account-based payment

transfer services. These services include two final customers of which the payer is the one making the payment and the payee is the one receiving the payment (Kemppainen 2003, 25).

Demand side economies of scale and future expectations

Demand side economies of scale are also referred to as consumption externalities. It is defined as the utility derived by a user increasing from the consumption of a product as the number of other users who consume the same product increases. Consumers' future expectations play an important role in network industries when it comes to the future size achievable by the network in question. The future expectations of consumers' often become self-fulfilling due to the clear existence of demand side economies of scale in retail payment systems. For example, a network such as a retail payment system has no additional value to a consumer if no other consumer is participating in the network simultaneously[10]. Henceforth, achieving a critical mass of users serves as a challenge for the adoption of any new payment systems or service in a network industry. (Kemppainen 2003, 30.) Too low consumer expectations might also result in a network not emerging at all even if the "aggregate consumer willingness to pay for the larger network should exceed the private financial cost of delivering such a network". This is a typical example of a market failure. (Guibourg 1998, 10.)

Switching and locked-in costs

Consumers and firms are often faced by additional costs, if they switch from one network to another. Switching from one system to another may be costly and lock-in costs can limit the willingness of demand side agents to change their service providers. These lock-in costs can harm competition especially in instances that are heavily protected through standardization and intellectual property rights. The before mentioned problem can be overcome by for example separating the provision of services from the provision of the physical infrastructure. This is often done in a way that the key market infrastructure is provided centrally thus enabling economies of scale. The services provided through the key market infrastructure will then be under competition as participants compete in providing them in the most efficient way to the customers themselves. (Kokkola 2010, 132.)

[10] This start-up roblem is also referred to as a "chicken-and-egg" problem. See for example Kemppainen (2003) or Guibourg (1998).

Switching costs may also hamper innovation and competition in the long run thus creating obstacles for any new system being able to reach a critical amount of users in order to become a highly valuable payment network. This is true for both the supply and the demand side. High entry barriers limit competition on the supply side since significant losses may be expected before a critical mass of users is reached. (Kokkola 2010, 132.) Upgrading or changing to a new payment system may also require significant investments from the payments service providers for example through large investments in new computer systems and training (Kemppainen & Salo 2006, 67).

4.4.3 Market Structure Implications

Natural monopolies[11] and the doctrine of essential facilities

Market structure and economic welfare are generally very much affected by the existence of economies of scale and scope. Natural monopolies are the logical result of strong network effects and significant economies of scale and they occur when a single firm or a payment system can satisfy the entire market's demand at a lower total cost than that of several individual firms. Hence, the market is also imperfect as the incentives to innovate and compete within the industry are missing. Generally, an attempt to reflect at least a minimum amount of competition has been made in larger currency areas by having duopolies serve the market demand in the payments industry. In such cases the market participants have usually cooperated in creating at least one of the two infrastructures. Such examples include the EURO1 and TARGET2 large value payment systems as well as Visa and MasterCard. These duopolies appear sustainable even when the actual network size differs between them due to fragile differences in the products offered. This means that competing products are not viewed as perfect substitutes. (Kokkola 2010, 35.)

Bottleneck monopolies are a type of a natural monopoly which has over time become reformulated as the doctrine of essential facilities. The underlying argument is that one or more companies control a certain segment, often an intermediary, thus inhibiting the relevant facility from being duplicated. This relevant facility can be some important kind of infrastructure or a non-substitutable production factor. Monopoly companies have an incentive to limit access to

[11] The existence of natural monopolies is also referred to as the phenomenon of "tipping".

the intermediary segment thus extending their monopoly power in another segment of the market, which is often defined as the market for end products, in which competition is prevailing. (Guibourg 1998, 18.) This sort of a market failure appearing as highly concentrated markets with high barriers to entry for new payment networks may also naturally raise concerns about significant pricing power (Bolt 2013, 75). When looking at the pre-SEPA national retail payment markets it can be observed that such a bottleneck monopoly could be formed for the competitive product and service layer since the ownership of the scheme and processing layers were not necessarily separated.

Path dependence

History plays an important role in a network market and can explain the development into the current national payment system regimes. The pattern of technology adoption needs to be taken into account when looking at the current market equilibrium hence indicating that the effects of decisions by early adopters are often significant when looking at the decisions made by later adopters in network markets. This is called path dependence and it also explains the gradual change of payment habits in a country. (Kemppainen & Salo 2006, 68.)

Excess inertia / excess momentum

Excess inertia refers to a network industry tending to get locked-in to obsolete standards or technologies (Kemppainen 2003, 36). A possible hold-up problem may occur when the adoption of a standard necessitates substantial irreversible investments by other participants thus essentially locking them into a certain set of technologies. In such cases, the owner of the patent may try to exploit this lock-in effect by charging higher rents and license fees for the use of the standard. (Hunt et al. 2007, 17.) The opposite of excess inertia is excess momentum in which a network industry is biased towards a new and superior technology even when it is incompatible to the current one. Both of these effects are essentially decisions taken by current users in relation to future users (excess inertia) or past users (excess momentum). As in network markets in general, excess inertia is argued to be the dominant characteristic out of these two in retail payment systems. (Kemppainen 2003, 36.)

Underinvestment and underproduction

Network externalities for customers and the requirement for cooperation in payment service provision guides investment decisions by individual service providers to depend on investment decisions made by other service providers. These investment interdependencies imply that the social rate of return may be significantly higher than the private rate of return to the investment. Therefore, when each service provider conducts investment decisions individually, the internationalization of potential externalities becomes more challenging than through a cooperative joint venture. This may result in underinvestment by the PSPs for example through the lack of cooperation among the service providers or due to regulatory restrictions. (Kemppainen 2003, 26).

Underproduction of a network good or service refers to the social benefits of joining a network exceeding that of private benefits. This is due to the fact that when a user joins a network, the decision does not take into account the additional benefit derived for other network users due to the increased size of the network. This is also claimed to be a significant problem in payment systems where economies of scale are present. (Kemppainen 2003, 38.)

4.4.4 Standardization and intellectual property rights

The issue of attaining the right kind of a balance when it comes to intellectual property rights is considered to be especially difficult in the context of financial services including payment systems (Hunt et al. 2007, 1). The conflict between setting a standard and the intellectual property rights is often very complex due to contradicting goals: the intellectual property right was designed to stimulate innovation giving the owner a right to exclude unauthorized use while standardization is used as an incentive to use an innovation adopted as a standard. Hence, a compromise must always be found through which both parties will be satisfied. This is considered to be particularly difficult with industries in which interoperable standards are essential to enable products and services to be compatible with each other and hence to maximize the benefits of network externalities. (Hunt et al. 2007, 3.)

The information technology system enabling a functioning payments industry infrastructure comprises a range of different fields such as security technologies, data communications, and

data management, which have been based upon a vast amount of independent patents. The coordination of network industries through interoperable standards has the potential for obtaining significant economic benefits including a larger market with "greater economies of scale and [a] greater ability to sell complementary goods". Social value is gained through agreeing on a standard, even if it would not concern the best technology available. (Hunt et al. 2007, 8.) Commonly accepted and open standards are a key requirement for promoting payment system efficiency as they promote "competition in the market" by facilitating the contestability of the market (Kemppainen & Salo 2006, 60).

Intellectual property rights and standard setting interact through several different factors. Intellectual property rights give the owner an exclusive right to determine how the property is being used. The consent of the owner is always needed with terms that also satisfy the users before setting up a standard. After a standard is set the value of patented technology may significantly increase due to standardization relative to an environment in which no such standard existed beforehand. However, the use of a standard will also limit future technological development since a standard is always used to coordinate the adoption of only one or a few different types of processes or technological solutions that can be used. Hence, the degree of technological overlap between firms will generally increase over time because of standardization. The process of standardization is further made more difficult by the fact that it is time-consuming and "involves decisions subject to uncertainty and asymmetric information". (Hunt et al. 2007, 11.) Nevertheless, it should be made sure that a "level playing field" is created by which "competition for the market" persists through adequate incentives for further innovation and investments (Kemppainen & Salo 2006, 60).

Typically, a full disclosure of any technological innovation is required when the innovation is proposed to be adopted as a standard. The licensing terms may also be specified for the use of the patent by other participants. These terms should be generous enough to reward the owner of the patent for the risks that they have undertaken when investing in their research and development but should be low enough so as not to discourage the potential future users of the technology from adopting the standard. Furthermore, substantial investments in the adoption of a standard may result in a locked-in effect presented earlier. This risk should be mitigated during the standard setting process, but is not often completely extenuated because of the lack of power in obligating participation of technology providers or though the dictation of licenses which did not get voluntarily involved in the standardization process. (Hunt et al. 2007, 17.)

An unresolved dispute might eventually lead into the adoption of a technologically inferior innovation as a standard, and hence limit the potential efficiency gains possible through the most advanced technological innovations (Hunt et al. 2007, 3).

Because of the above mentioned risks, it is of essence that any standard setting organization is able to come up with a wide consensus between both the users and the producers of any certain patented technology. The establishment of a clear and an undisputable intellectual property policy is an essential aspect when it comes to building up such a consensus. (Hunt et al. 2007, 17.) This would appear to be of high importance especially in a network industry as the successful setting up of industry wide standards has an opposing effect on competition as regards to strong network effects: standardization fosters competition. Incompatibility is seen as restricting competition and it can be overcome by creating common content and delivery platforms through standardization. This will also limit the fear of users from committing to a wrong technology and also lowers barriers to entry in a specific industry. It will be easier for any new entrant to enter a market with new products and services when the need of contemplating the right standard is highly limited. Standardization will also result in compatible products competing more with price and less on design. (Palva & Penttinen 2012, 96.)

Perfectly competitive markets are the best form of a market from the viewpoint of social efficiency as per elementary economic theory. However, as debated above, the existence of network effects and economies of scale in the payment market would indicate, that this is not the case always. Therefore, from the perspective of the profits of the PSPs as well as from the perspective of social welfare, large production units as well as cooperation between market players are hence justifiable. Larger networks for products and services with network effects are "better" from the perspective of social welfare. (Guibourg 1998, 10-11.)

5. IMPACT ON PAYMENT SERVICE PROVIDERS AND USERS

5.1 Expected benefits of SEPA

5.1.1 Supply side benefits

The ECB lists the benefits of SEPA for the supply side namely from the perspective of the PSPs and the infrastructure. PSPs will be able to offer their services in a more convenient way to customers regardless of national boundaries. Additionally, they will be able to meet their customers' demands better in the future through the eSEPA services built on top of the core SEPA products. Competition will be enhanced through a single set of rules, equal and open access to the European market, reachability, transparency and interoperability as well as the possibility of PSPs in negotiating better conditions for themselves with their service providers. Likewise, cost efficiency will be improved especially in relation to cross-border transactions as the principle of equal charges through regulation (EC) 924/2009 was reinforced by regulation (EU) 260/2012[12] and hence results in cross-border payments becoming as simple, efficient and inexpensive as pre-SEPA domestic payments. (European Central Bank 2013a.)

Technical interoperability is a key element driving market integration in SEPA through the underlying infrastructure. Wider scope and consolidation as well as the separation of scheme management and processing infrastructures from each other are to be the main benefits in relation to financial market infrastructure. Most retail payment infrastructures have processed SCTs since their launch in January 2008 and according to the ECB (2013a) several infrastructures have already taken the step into becoming pan-European service providers instead of being purely domestic operators. The separation of scheme management and the underlying processing infrastructure from each other has been a key element in this, thus enabling infrastructure providers in offering their services to all PSPs in SEPA. This will increase business opportunities and competition for infrastructure providers as for example card processors should be able to serve different card schemes and acquirers throughout SEPA. (European Central Bank 2013a.)

[12] Regulation (EU) 260/2012 banned the 50 000 euro ceiling previously set as a limit for which equal charges would apply.

The responsibility of the actual implementation of SEPA will to a large extent be laid on banks and other financial institutions and hence it is intrinsic that they become aware of the scale of opportunities created by SEPA. All banks processing retail euro payments will be affected and not just the ones inside the Eurosystem. By defining core features and best practices through the new payment schemes the user community of SEPA is left to build new products and services for the market. Competition between banks is going to increase as one home account can then be used to serve customers in several different countries. High volume payment processing products can be offered by larger banks while smaller banks could also specialize, for example, into serving a niche market through development and delivery of new products. The end to end automatisation, owing to an advanced level of standardization, will also promote higher security and enable higher fraud prevention in the retail payment network than before. (European Payments Council 2007, 62-63.)

The successful development of a common account processing engine could reduce country specific costs as well as prompt mergers and acquisitions in the banking sector. Operational costs of banks and the overall costs of providing payment products and services are also expected to decrease on a general level due to common EU designs. This is in comparison to the provision of products and services according to different country specific criteria. (European Payments Council 2007, 63-64.) SEPA will also bring about increased transparency which will help reduce cross subsidization enabling payment product prices to be linked more closely with the respective costs. Transparency will also result in a more simple overall structure as well as improving customer clarity and meeting the requirements of regulator, consumer and corporate groups. SEPA will also make it necessary for all banks to go through and re-evaluate their pricing strategies and current revenue streams. (European Payments Council 2007, 65-66.)

5.1.2 Demand side benefits

Increased quality of services and standardization will help everyday transactions of consumers, companies and public administration. Including a faster process for handling payments, customers will be able to enjoy the freedom of needing to possess only one bank account through which all transaction can be made within SEPA. Electronic payments in euro to any location within SEPA will be as convenient and cheap as a national transaction. All SEPA compliant cards can also be used across the area thus limiting the need of having several

different payment cards. This will also limit the need for cash for example when travelling across borders thus also promoting safety and security. In addition, all transactions will be made faster than before as SEPA sets strict time limits for payments processing: one business day for electronic payment orders and two business days for paper-based payment orders. SEPA also aims at eliminating paper and promoting the use electronic payments. Hence, it will be easier for payments to be combined with innovative services further making the paying process even simpler and more efficient. (European Central Bank 2013a.)

In addition, companies will benefit from SEPA as centrally coordinated euro payments from a single account save time and money and enable liquidity management to be consolidated to a single location inside SEPA. Companies will also be able to enjoy the benefits of further electronic services in regards to eSEPA. This will include services such as e-invoicing and e-reconciliation and will help companies to further optimize the handling of payments. Until this point, such services have only been available nationally. Through standardized SEPA schemes, the use of these services across borders will become easier. The advantages of SEPA for public administration will be similar to that of companies and since 15-20 % of all credit transfers in the euro area are created by the public sector, moving this volume of payments to SEPA instruments will significantly contribute in gaining a critical mass. (European Central Bank 2013a.)

SEPA will also mean more choice, lower costs and better service for merchants. Payment cards will increasingly replace cheques and cash and have wider acceptability than before. Competition among acquirers offering their services to merchants will presumably also drive down production and certification costs. Lower production costs will be combined with the possibility of merchants being able to choose any acquirer in SEPA. Remote business will also be made easier as merchants and consumers will not have to worry about varying payment instruments when operating in different countries. Additionally, card fraud prevention will increase significantly through the adoption of the chip-based EMV standard. (European Central Bank 2013a.)

5.2 Theoretical and empirical assessment

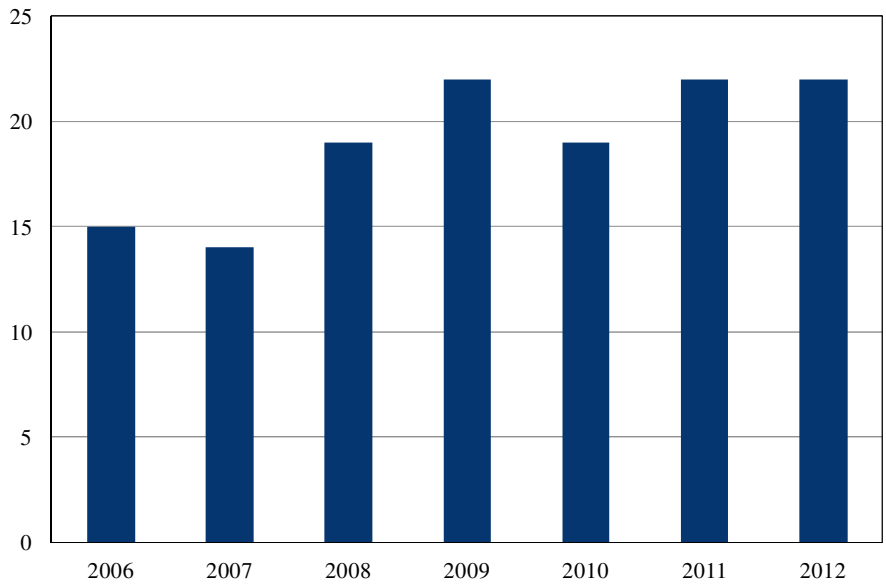
5.2.1 Increased competition and cooperation

Consolidation and mergers

Beijnen & Bolt (2007, 2) state that for SEPA to be a success, separate domestic national payment infrastructures must be replaced by a pan-European structure through which a higher level of economic efficiency can be obtained especially through the realization of higher economies of scale. The SEPA project is to create more competition between the clearing houses as they are all bound to be faced by the same and therefore compatible standards thus disabling former national and local monopolies. They continue by stating that SEPA is to result in mergers and consolidations among European payment processors as they seek to increase and secure market shares by looking for alliances and partners. This vision is heavily backed up by the existence of economies of scale as well as network externalities driven by SEPA.

The effects of payment processing industry integration can be seen in the large value payment markets in which the number of payment system operators has decreased down to two, TARGET2 and EURO1, from the original six after the introduction of the euro. The two remaining systems were also the only ones operating on an area-wide basis. Out of the other four systems EAF in Germany, PNS in France and SPI in Spain have ceased from operating and POPS in Finland has been reclassified as a retail payment system by the ECB. (Kokkola 2010, 177-178.) STEP2, which is operated by EBA Clearing, was the first euro-area wide retail payment system. The number of such systems is expected to grow in the future. When looking at the development in the wholesale payments market after the adoption of the euro and the tendency for a network industry to form natural monopolies, a hypothesis could be formed by which the eventual number of retail payment systems would decrease in the euro area due to SEPA. Figure 9 below illustrates the development in the number of retail payment systems in the euro area after 2006.

Figure 9: Number of retail payment systems in the euro area 2006-2012.



Source: European Central Bank (2013b).

Despite the theoretical approach backed up by earlier empirical evidence suggesting that SEPA would spur consolidations and mergers in the retail payments processing industry, the number of retail payment systems has actually increased during the past years. This is clearly observed from figure 9 and would hence prove our original hypothesis to be incorrect. Estimates about the number of future automated clearing houses in Europe have been given and according to Schmiedel (2007, 7), on average only seven out of the 15 ACHs were expected to survive beyond 2010. None the less, there has been a clear increase in the total number of retail payment systems in the euro area even past the 2010 estimate. Even though STEP2 remains the only pan-European ACHs at this point, it is evident that SEPA has not spurred an expected amount of consolidations and mergers within the retail payment market and the previous estimates appear to have been somewhat extreme. However, due to the fact that full standardization between the competing infrastructures will only finally be achieved 1st February 2014, it can be well argued that competition within the euro area retail payment market is expected to grow as the safeguards for national monopolies will soon be abolished. This might eventually reverse the trend currently seen in the actual numbers.

Notwithstanding the increase in the number of retail payment systems in the euro area, there has been some evidence of mergers that have taken place in accordance with the market structure implications of a network industry as well as with the predictions of the ECB. The merger between a Dutch ACH, Interpay, and a German ACH, Transaktionsinstitut, into Equens was the first merger to take place after the introduction of SEPA. The newly merged company in 2006 doubled its annual payment volume to 7 billion processed transactions making it the second largest in Europe. The merger was strongly influenced by the high potential for positive scale effects according to the former chairman of Equens, Ben Haasdijk. (Beijnen & Bolt 2007, 2.) Other such market changes have been the merger between SIA and SSB in Italy to form SIA-SSB and the clearing house SIT being replaced in France by STET, which was created by seven credit unions and now operating the payment system CORE (Kokkola 2010, 196).

On top of new area-wide systems replacing existing national systems, the integration of market infrastructures can be achieved in other ways as well: separate platforms could be consolidated to form one single platform or the platforms could be made interoperable. One such example is an agreement to establish interoperability for the exchange of SEPA payments between Equens, Seceti, STET and VocaLink and this process was expected to continue as SEPA migration preceded. (Kokkola 2010, 196.) This could arguably be one of the reasons behind the actual increase of the retail payment systems during the past years. As platforms can be made interoperable the need for a full consolidation between the payment systems themselves decreases. However, Kokkola (2010, 195) does point out that the significance and transaction volumes of older legacy systems will continue to diminish as is the case for example with the Finnish based PMJ payment system. PMJ is also an example of a legacy system that will be replaced in due time by SEPA payments being moved for processing to STEP2. Therefore, PMJ is currently distorting the number of retail payment systems implied by the theory as it is set for closure in the future.

Guibourg (1998, 15) point out that “the existence of positive network externalities and economies of scale will probably create sufficient incentives for collaboration”. This is exactly what has been observed and as Guibourg (1998, 15) continues: “discrimination/exclusion of players [] occurs as competitive effects begin to play a larger role” hence presumably occurring “when economies of scale and network externalities are nearly fully exploited”. Therefore, the evidence presented would argue towards SEPA actually enabling larger economies of scale and network effects in payment processing as further consolidations are still expected. Doubts have,

however, been raised as to whether the expected effects through scheme management and processing infrastructure separation for cards will be achieved through SEPA. In January 2007, it appeared that not all card schemes had effectively separated their processing activities from their scheme management functions thus limiting the possibilities of reaching the aimed level of competition between the automated clearing houses. (European Central Bank 2010, 24.) This would indicate that the final aim of SEPA, when considering the level of competition between the automated clearing houses, might not be fully achieved. However, such a conclusion might once again be premature as full implementation of SEPA has still not been reached.

Changes in ownership structure

Beijnen & Bolt (2007, 2-3) emphasize that a change in the ownership structure in the payments processing industry is of essence in the new pan-European system when it comes to increasing competition between the ACHs and creating a level playing field. The countries which still currently have ACHs operated and managed by central banks will need to change their form of governance structure, if they aim at becoming pivotal players within the SEPA region. This is why the largest French payments processor with almost 12 billion annual payments has changed its governance structure from a publicly to a privately owned institution. Other countries have also decided to transfer their total domestic payment processing volumes to STEP2, the pan-European ACH owned by commercial banks. (Beijnen & Bolt 2007, 2-3.)

According to Kokkola (2010, 46) there "is a convention whereby central banks avoid competing with commercial banks in most of the payment services provided to the non-bank public, for example by seeking to apply fair pricing policies". However, Beijnen and Bolt (2007, 8) find that central banks cross-subsidize their processors to a higher degree and hence show lower costs than privately owned processors. This is assuming that technology is a non-rival good and that economies of scope play a less significant role than scale effects. The movement from a publicly owned governance structure to a privately owned should correct any such distortions in payments processing costs and hence enable a more fair competition between ACHs left in the industry. Nevertheless, Beijnen & Bolt (2007, 10) do conclude that the ownership structure does not seem to have any influence on the level of economies of scale attainable by ACHs even when the cost side would appear to be affected.

The ownership structure of retail payment systems is due to economic efficiency and competition reasons moving towards privatization while only the core interbank transfer systems appear to be staying under central bank ownership. Competition between the private and the public sector is kept low by the private sector dominating in the retail payment market while the large value payments market is clearly in the hands of the public sector especially through TARGET2.

5.2.2 Initial investment and cost side implications

Switching and locked-in costs

As a general case the use of several payment systems simultaneously will result in higher costs compared to the normal situation in which banks only support the use of one payment system at a time. This can be easily argued for and therefore the European Central Bank is pushing all stakeholders for a fast migration to SEPA (European Central Bank 2011). As discussed earlier, payment systems are networks that highly contribute to positive network externalities thus enabling significant economies of scale. Meanwhile, they include substantial locked-in costs due to a complex infrastructure requiring high maintenance resources as well as security investments and hence the simultaneous use of several separate payment systems would indicate unnecessary additional real resource costs for the system and service providers. (Kokkola 2010, 133.) Figure 9 before would indicate that these additional costs are currently apparent as the number of retail payment systems has rather increased than decreased during the past years.

The EPC (European Payments Council 2007, 11) underlines the costs of bank migration to be very substantial given the size of the market. However, they further argue that "the long term efficiency gains and improved competition from a common payments market will be equally substantial and will eventually more than offset the initial outlay." The empirical study by Hasan et al. (2009, 24) would appear to support this statement as they find banks performing better "in terms of both their accounting ratios and their profit and cost efficiency" in countries with more developed retail payment services. This is very much in line with what SEPA aims at achieving. According to Yoon (2007,15), the substantial investments required by banks coupled with plummeting revenues should also encourage banks to aim for maximum economies of scale and scope that SEPA can offer.

Table 2 presents some estimates of these substantial investments (the real resource costs) required by the banking sector in order to make SEPA a reality, thus also partially portraying the switching costs inherent in network industries. When looking at the investments required by the banking sector it must be kept in mind that this sector has substantial IT investments inherent to the business model on an annual basis. Henceforth, part of the estimations presented would be incurred by the banks in any case when updating the legacy systems. These investment costs will at most be reflected on customers, companies and public administrations indirectly through increased charges as the implementation costs will be borne by the supply side stakeholders.

Reported estimations of needed investments by the European banking industry	**Size of investment (billion euros)**
Accenture/PSE Consulting 2006	3-8
Boston Consulting Group 2006	0,5-5
CapGemini Consulting 2007	7,4-9,8
Eurogroup/FBF 2007	9,1-12
Ifex Solutions/Financial Insights 2006	5,4
TowerGroup 2005	8

Table 2: Initial investment estimates of SEPA (Väisänen 2008, 8)

As new investments into payment systems infrastructure will be required in the long run in any case, the fact that the European Commission is pushing for a fast migration could also be seen as a positive effect in creating a critical mass to achieve economies of scale. Since SEPA will replace the legacy systems with a set timetable, achieving a critical mass in the new retail payment systems should not become an issue. As it seems to be rather widely accepted that SEPA is a step forward in payment infrastructure development, pushing for a fast migration end-date could be argued to refrain banks and other service providers from having to undergo a long period of losses from taking a new payment system into use. A critical mass will be achieved relatively fast after which the industry may begin enjoying the positive network externalities and economies of scale brought on by the development.

An alternative conclusion is also evoked by Schaefer (2008, 23) as he argues that the "risk of pursuing an overly costly project and the resistance from the payment industry could have been substantially smaller" if the implementation phase would have been significantly longer. Hence, it would better match the costs induced by SEPA updates with the regular updating of payment systems within the technological innovation cycle. This comment further emphasizes the fact that government intervention can be seen as the predominant force behind the SEPA project as it was only after Regulation (EC) 2560/2001 banning the possibility of charging higher fees for cross-border payments that the European banking industry decided to form the EPC to address the issue of increased integration.

When looking at the estimates of the costs for the banking industry at the beginning of the implementation phase, it does not strike as a great surprise that no tangible results leading to anything like the SEPA project were achieved by just the Eurosystem and the European Commission pointing out the need for improvement in cross-border services in the beginning of the euro era. As is evident from the disparity of the estimates themselves, Väisänen (2008, 7) has further pointed out that it is generally believed that investment costs to banks will increase due to SEPA but their magnitude is unknown.

Profit margins and price of services

Schaefer (2008, 18) argues through theoretical reasoning that the consolidation of automated clearing houses is to result in lower transactions costs for banks when providing services to their customers. An empirical investigation on European banks by Bejnin and Bolt (2007, 13) shows that total operating costs increase by approximately 25-30 % as the total payment volume is doubled. This would indicate a significant decrease in the average processing costs and provide a strong argument for future consolidation in the payments processing industry. The findings are also well in line with the theory of supply side economies of scale. However, Beijnen & Bolt (2007, 5-6) do emphasize that detailed and publicly available cost data related to payments processing are hard to find and hence the analysis is based on a variety of sources.

Schmiedel (2007, 7) points out that one reason for SEPA not having an instant effect on the revenue side is due to the scale and complexity of regulatory costs that require significant IT resources, which would normally be used for product and business development. Schmiedel (2007, 20) further argues that an impact on the revenue side of the banks is expected to appear

in the longer run after older payment systems have been fully replaced by SEPA, while the costs are expected to decrease because of potential economies of scale and new innovations. He also underlines the major role played by increased cross-border competition and new market entrants on this (Schmiedel 2007, 7). Capgemini and European Commission (2008, 4) find that even the most aggressive scenarios would indicate that margins continue to grow in absolute terms as the decrease in operational costs are to outweigh the reductions in revenue. Further on, they find that SEPA "holds a market potential of up to 123 billion euro in benefits (cumulative over 6 years) with a significant upside for all stakeholders while allowing banks to retain current margins".

Kemppainen (2008, 32) argues through theoretical reasoning that SEPA will not only lead to increased customer surplus and total welfare through network externalities, but it will eventually also result in increased prices for customers and in higher profits for the banks especially in the debit card market. This is if the fixed investment costs of SEPA are not prohibitively high. Increased costs are something that was not explicitly predicted by the ECB or the European Commission for the end-customers and companies and according to the ECB (2013d, 90), a 90 % decline was observed between 2001 and 2005 in the average fees for cross-border transactions. However, the ECB continues by pointing out that the fee structure for payments is still today "far from homogenous" thus also possibly portraying one reason for why the use of non-cash payment instruments varies so widely in the EU: the number of cashless transactions in the Nordic countries being five to six times as high as in some southern European countries.

iff, London Economics and PaySys (2013, 53) state that even though PSPs in general appear to respect the rule of equality of charges between domestic and cross-border payments across member states, price convergence cannot be said to have occurred. Nevertheless, they do continue that "it is not possible to conclusively say that a lack of competition is driving these findings" without the availability of information on "the cost to the payment service providers for producing the different payment services" in each member state. The ECB (2013d, 90), on the other hand, appears convinced that wider competition is a key factor and expects further price convergence between countries to materialize after the SEPA migration is finalized. The ECB continues by pointing out an example of how direct debit creditors (e.g. utility companies) will be able to "move their direct debits to a payment service provider from another country if that service provider offers a better deal". This was not possible previously as cross-border direct debits did not exist before SEPA. Also merchants are likely to benefit from the push

towards a more cashless retail payment market as set out by Guibourg (1998, 16) arguing that this will "diminish both their costs and their risks."

5.2.3 New innovations

The EPC's view presented earlier about SEPA not just being a regulatory change of payment infrastructure, but instead an opportunity for banks, is also further contemplated by Palva & Penttinen (2012, 95) stating that SEPA should rather be viewed as a "platform paving the way for value-added services, such as fully automated accounting and improved cash-flow forecasting. After this, Palva and Penttinen (2012, 100) also emphasize that "those institutions which embrace new technological developments, create new businesses and provide innovative services are likely to gain most from SEPA". According to them, international companies will also be able to benefit from economies of scale and better capacity utilization with harmonized standards brought on by SEPA. The opportunities for potential benefits include centralized cash management activities, the use of international payment service-providers, and e.g. consolidations of various IT systems into shared service centers enabled by the use of harmonized standards. Even software suppliers will have an opportunity to develop new products on an entire SEPA market scale. Competition will further be increased hence also potentially resulting in reduced costs. (Palva & Pentttinen 2012, 100-101.)

One important aspect of innovation is the concept of eSEPA defined by the ECB (2013a) as SEPA "in which service providers make use of advanced information and communication technology when offering payment related services". However, the Eurosystem has pointed out its disappointment towards the slow progress made by the EPC in the domain of e-payments[13] (ECB 2010, 28). In 2010, only 8 percent of online shoppers in the EU bought from another country while 60 percent of attempted cross-border internet shopping orders failed due to technical or legal reasons. Therefore, many consumers still have to rely on less efficient and more expensive payment methods such as cash on delivery due to them being unable or unwilling to shop online. (ECB 2010, 30.) The report by Ecommerce Europe and Innopay (2012, 48) points out that "legal certainty on the business level is a precondition for innovation

[13] E-payments are widely defined by the ECB (2010, 29) as "payments that are initiated, processed and received electronically.

in the payment industry" and hence "the current ambiguity does not contribute to a decisive atmosphere".

During the course of several years, the EPC has been "working on the design of a framework that outlines specific rules and standards for OBeP (Online Banking ePayment) schemes" with the intention of having a payment guarantee for web retailers. This would enable a customer to pay an online purchase from another country through a normal online bank account without the need for both the customer's and the merchant's banks to be members of the same scheme. However, the goals of the framework are deemed as problematic as the EPC has defined them as optional thus potentially resulting in a coordination problem and a "wait-and-see approach" by market participants. Some communities also appear to fear the development of attractive e-payment solutions since they are believed to reduce the revenue streams from the payment card business. (ECB 2010, 31.) However, Hasan et al. (2009, 24) have empirically found that competition in retail payment instruments is actually "associated with better bank performance, as is greater use of electronic retail payment instruments". This "wait-and-see" approach would therefore possibly indicate a case of underinvestment as additional cooperation between market participants might result in an overall welfare gain for all through promoting cross-border retail purchases.

Recently, the European Commission has put a stop by an investigation on the interoperability pilot between three existing national OBeP payment schmes (EPS, iDEAL and Giropay) due to allegations of anti-competitive behavior by the EPC which had commissioned the pilot (Ecommerce and Innopay 2012, 50). This case, on the other hand, implies just how delicate the trade-off between competition and cooperation in a network industry is and potentially resulting in collusive behavior as presented earlier. While outright anti-competitive behavior should be minimized some cooperation must be enabled to avoid underinvestment just as described above. This move appears to be leaving EBA Clearing's MyBank solution currently as the only prominent OBeP solution with a pan-European reach.

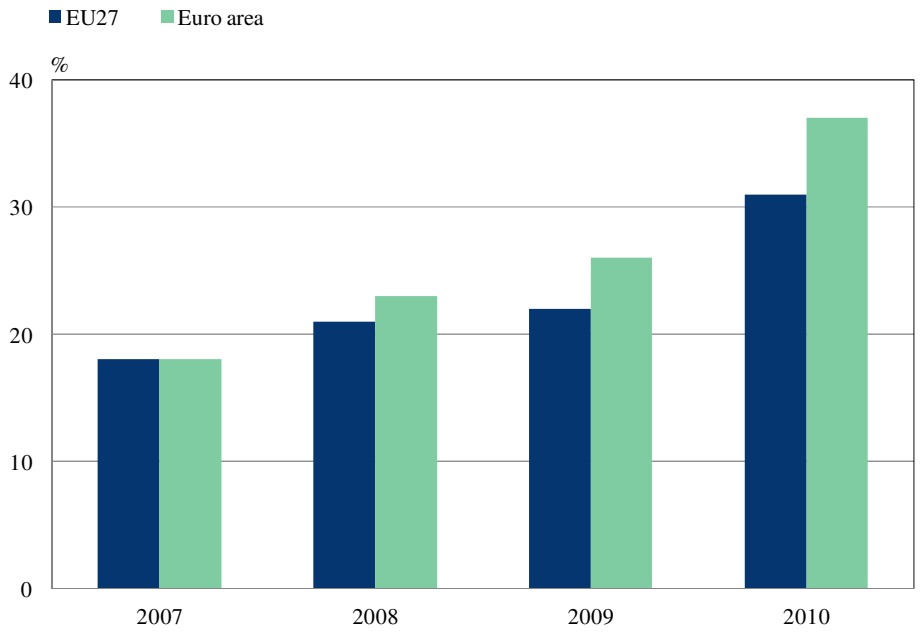
According to the ECB (2010, 32), mobile payments (m-payments) provide "an ideal launch pad" for SEPA payment instruments due to the wide use of mobile phones across the

continent[14]. However, they continue to state that "a broad implementation of m-payment solutions across SEPA is still not in sight". The Eurosystem is pushing for more tangible results and more transparency by the EPC so as to "avoid the development of proprietary solutions with limited (geographical) reach". For example, mobile prepaid solutions could potentially support m-payments becoming widely acceptable while contributing to the introduction of electronic payments in the areas currently dominated by cash-based low value payments throughout SEPA. Therefore, EPC is urged to foster the creation of a development strategy by which a wider market adoption of m-payments "emanating from the existing infrastructure and pilots[] could help to resolve the current chicken-and-egg causality dilemma". Market players appear to be waiting for a mass demand from users before conducting new investments while users' demand is slowed down by the low availability of products on the market. (ECB 2010, 32-33.)

Other innovations on top of e- and m-payments include currently e-mandates and e-invoicing. The e-mandate process based on online banking services enables SDD mandates to be created through electronic channels allowing debtors and creditors to agree on the mandate in a completely electronic manner. The e-mandate service is an optional feature for the SDD scheme rulebook, which has been provided by the EPC. Electronic bill presentment and payment (EBPP), on the other hand, enables electronic means of "sending or making available of invoices and their subsequent processing and storage". Faster payments, fewer errors, reduced printing and postage costs and full process automation and integration from order to payment between trading parties are considered to be substantial benefits over paper-based invoices. The use of e-invoicing is estimated to save 65 billion euro by businesses in SEPA. (ECB 2013a.) Figure 10 below illustrates how enterprises are currently shifting from paper-based invoices into sending and receiving e-invoices.

[14] ECB (2010, 29) defines m-payments as "payments for which the payment data and the payment instruction are transmitted and/or confirmed via mobile communication and data transmission technology (e.g. voice telephony, text messaging or near field communication – NFC) through a mobile device between the customer and his/her payment service provider in the course of an online or offline purchase of services, digital or physical goods.

Figure 10: Enterprises sending and/or receiving e-invoices 2007-2010.



Source: Eurostat (18.9.2013)

E-invoicing would also appear to be the most successful technological innovation taking place so far with a pan-European reach. This can be observed to be the case from the rapid growth of such invoicing means in figure 10 above. The observed difference in the share of enterprises observed between the EU-27 and the euro area would indicate some progress having been achieved potentially through SEPA after the beginning of the implementation phase. However, it must be kept in mind that extensive differences between countries persist to exist with Italy having the highest share with 56 % and Cyprus having the lowest share with 9 % in 2010 (Eurostat 2013). Both of these countries belong to the euro area countries first to be migrated into SEPA by the 1st February 2014 end-date. Therefore, they also raise doubts as to how much credit can be laid down to SEPA being the core reason behind the actual increase observed in e-invoicing.

5.3 Challenges in implementation

Palva & Penttinen (2012, 99) highlight the prerequisite for competition and enhanced efficiency to be the consistent and harmonized implementation of standards. This has proven to be a challenge even when SEPA standards are based on the ISO 20022 standards. As such, Hunt et

al. (2007, 1) summarize that a network industry would imply significant gains associated with standardization by which many potential customer benefits could be lost, if not treated with the attention it requires.

Issues within the implementation of standards have been especially apparent for the customer-to-bank and bank-to-customer communication space for which no agreement was originally even reached by the EPC in relation to the use of standards. Only a recommendation was given for this while the standards were originally agreed to be used only for SEPA payments between banks. Unfortunately, the EPC implementation guidelines have not been unambiguous and clarifications have been needed. The implementation of ISO 20022 standards in a consistent and harmonized manner has also been problematic globally. Therefore, a number of global banks, SWIFT, corporate and vendors established a "Common Global Implementation" (CGI) in 2009 for the ISO 20022. Later on they have also published implementation guidelines to address this issue. (Palva & Penttinen 2012, 99.)

New standards on top of the ISO 20022 standards also possess challenges. The ECB (2013d, 93) gives "strong governance" as a solution in promoting Europe-wide solutions irrespective of country of origin to adequately overcome the current fragmentation in the retail payment market. Innovative payment services are often provided outside the banking sector by licensed and non-licensed entities thus resulting in third parties rapidly gaining importance. Therefore, the "extent of payment account access, the appropriate legal and regulatory framework, the need for contractual agreements, costs related to providing access, data protection and consumer rights are issues" in need of being addressed at policy level so that a level playing field for PSPs can be maintained. (ECB 2013d, 93.) Hunt et al. (2007, 25) point out that European companies can very easily be left under the discretion of foreign companies abiding to a different intellectual property culture, if no compulsory licensing agreements are reached.

The EPC has been an active participant in addressing the issues relating to retail payments since its very establishment. Nevertheless, Hunt et al. (2007, 25) point out a general concern relating to economic theory: EPC's members consist solely of banks, which are simultaneously the service providers of retail payments. Therefore, a standard setting organization such as the EPC, which does not possess a strong portfolio of intellectual property itself, has "an incentive to implement an explicit but tough intellectual property policy toward technology vendors". Hunt et al. (2007, 28) continue by pointing out that even thought the EPC, the European Commission

and the European Central Bank have committed themselves in creating an open and a common standard the management of intellectual property policy is not entirely clear. Henceforth, the authors are afraid of SEPA potentially going down the same path as with the GSM standard previously: the involvement of public authorities concerning the GSM standard prevented a standards war, but it did not succeed in creating a truly open standard as only a limited amount of participants were able to license the essential patents (Hunt et al. 2007, 18).

6. FRAGMENTED EURO RETAIL PAYMENTS LANDSCAPE

6.1 Indicators of payment market integration

The ECB (2013d, 86) states that "[f]rom a macroeconomic perspective, the realization of a more efficient retail payments market through SEPA can facilitate trade, increase competition and innovation, foster financial integration, and add to the completion of the single currency (and monetary union). Thus it is an important tool for strengthening EU competitiveness and growth." Bolt & Schmiedel (2009, 8) add to this by pointing out that cashless transactions increase the efficiency of financial markets similar to any other financial innovation allowing lower transaction costs and facilitating the exchange of goods and services. They continue by stating that the amount of cashless payments has significantly increased by about 6 % per year within the EU. Nevertheless, retail payment markets inside the EU have continued to be highly fragmented and substantial asymmetries in cashless payment usage have continued to persist between the member states. Schmiedel (2007, 5) highlights that despite the introduction of euro banknotes and coins, a true domestic and an internal market for non-cash retail payments has yet to be achieved within the euro area and hence initiatives have been taken in order to reap the full benefits of the single currency.

Kokkola (2010, 173) underlines the fact that SEPA sets outs to tackle the issue of a relatively diverse retail payment market landscape, which was not necessarily best suited for the needs of a single currency area as the infrastructure for promoting quick and smooth processing of payments at a low cost. However, the effects of SEPA will very likely vary from country to country depending on the previously used domestic payment systems. For example, the Nordic countries in general have been using highly advanced systems already before the introduction of SEPA. Therefore the positive economic effects experienced by the Nordic countries are presumably going to be smaller compared to the less advanced central and southern European countries. According to Iivarinen & Ripatti (2010, 14), for example, the Finnish banks have had to add extra services to SEPA in order to keep up with the same service level as before. Meanwhile, for example cheque based payments have been completely disregarded in SEPA for them being considered as old fashioned (Iivarinen & Ripatti 2010, 8). The gradual movement from cheques to more electronic and automated means of payment may therefore eventually result in higher positive economic effects in some countries compared to others who were on a

higher level of efficiency already before SEPA. This could be the case with countries such as France, where paying by cheque is still rather common. Economic efficiency increases when customers move on to more efficient methods of payment.

In order to better understand the potential retail payment market evolution brought about by SEPA, it is essential to compare current market situation to the "starting point". It was in 2001 when the political decision was made to address the fragmented payments landscape in the euro area by passing Regulation (EC) No 2560/2001[15] thus providing us with a logical reference point for analyzing market evolution until 2012 for which the latest payments data is available. The fragmentation of the payments market in the euro area at the beginning of the single currency euro can be illustrated through the following three key indicators: (i) fragmented payment habits between countries, (ii) the distinct differences in the automation rates and (iii) the inefficiency of cross-border retail payments. The overall effect of SEPA will be monitored against these three indicators.

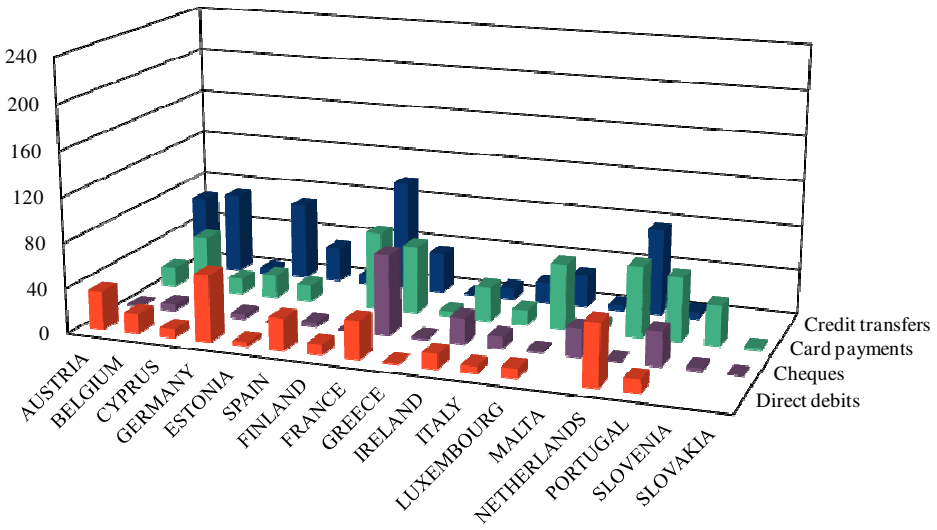
6.1.1 Fragmented payment habits across the euro area

Figures 11 and 12 below illustrate the volume of cashless payments per inhabitant within the current 17 euro area member states from the years 2001 and 2012, respectively, and portray the heterogeneity of the use of the main non-cash payment instruments: credit transfers, direct debits, card payments and cheques. It is evident that during the course of the past 11 years payment habits have changed in the euro area countries. One significant change instantly observable is that the amount of cashless payments per inhabitant have increased substantially hence also giving rise to stronger economies of scale and scope in the payments processing industry. Convergence between payment habits of the euro area countries is also evident to some extent. Despite the progress observed it is necessary to point out that heterogeneity in payment habits across the euro area countries does seem to remain significant also today and can most likely be attributed not only to path dependence, but also to underinvestment in network economies.

Kemppainen & Salo (2006, 73) point out that path dependence is most likely influenced through the structure of the service providing sector, national payment traditions and the legislative

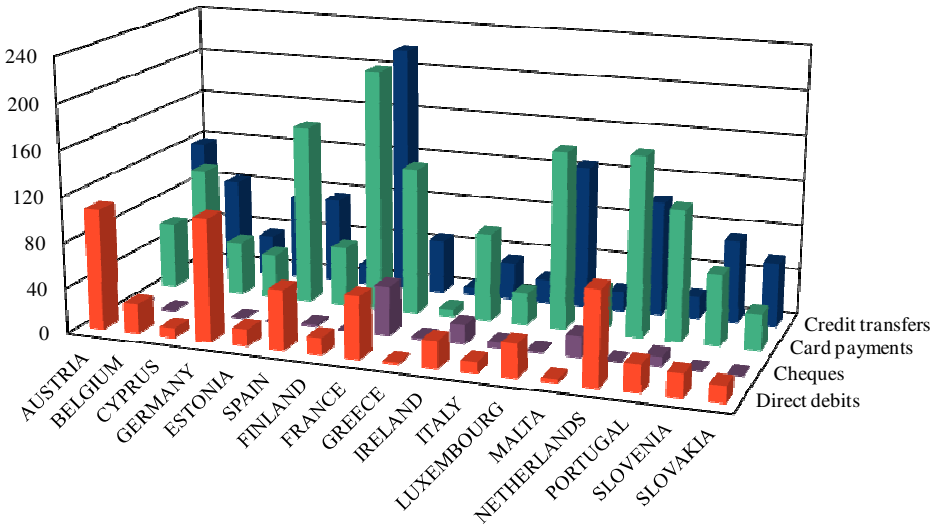
[15] Regulation on equal charges for cross-border and domestic payments in euro.

Figure 11: Volume of cashless payments per inhabitant in 2001 in the current euro area countries.



Source: Statistical Data Warehouse of European Central Bank (18.9.2013).

Figure 12: Volume of cashless payments per inhabitant in 2012 in the current euro area countries.



Source: Statistical Data Warehouse of European Central Bank (18.9.2013).

environment. They also point out that path dependence would appear to be stronger in the EU-15 countries while being weaker in the newer member states. This is most likely due to a "lighter burden from the historical systems" hence enabling a rapid adoption of the most efficient payment methods. Riksbank (2013, 41) adds to this by underlining retail payment markets in other countries to be dependent on the current payment service demand, which in turn is dependent on consumption patterns, the structure of the industry and commerce as well as in part also on the current appearance of the financial infrastructure. Since it is less expensive to hold on to the current infrastructure by making minor improvements to it rather than building a new one from scratch, inertia in the structure has resulted in the situation staying partly the same over a longer period of time in several countries. The Federation of Finnish Financial Services (Finanssialan keskusliitto 2008, 4) also points out the differing billing span between countries to be an example of a partial reason behind the disparity between the numbers of conducted transactions on top of the varying methods of payment: rent, utilities, phone and internet expenses are paid in other countries on a monthly basis while in others it could be done on an annual basis.

Despite some common features in the increasing numbers of card payments and credit transfers in general, fragmentation between countries stays relevant. The use of cheques would appear to be one of the most evident examples: their volume is still rather significant in countries like France, Cyprus and Malta while this form of a payment method is practically non-existent in countries such as Finland, Estonia and Luxembourg. The seemingly slow convergence of payment habits of the first 12 countries to take euro banknotes and coins into use in 2002 gives further evidence of the lack of a true domestic and an internal market for a non-cash retail payment market within the euro area. This would indicate underinvestment by PSPs as the lack of cooperation between them is evident in 2001 when compared to 2011 by which time the industry had formed the EPC and is fast approaching a pan-European deadline for SEPA migration. Nevertheless, it must also be noted that it was only until the passing of the PSD that a common legislative framework was created to enable such a project as SEPA to be ultimately achieved thus also portraying the significance of regulatory reform in enabling further payments market integration.

According to Kemppainen (2003, 13) the "slow and imperfect integration of the international financial markets" is most likely also a relevant factor behind national development paths in payment systems in the past. He continues by saying that this has recently been under pressure

for compatible systems especially because of the EMU. Even so, it must be understood that the idea behind the comparison does not necessarily indicate that payment habits over the euro area member states should become completely homogenous and a goal by itself. This is because it is probable that the reasons behind are various and heavily rooted to the respective cultures and ways of conduct as implied also before.

6.1.2 Automation rate[16]

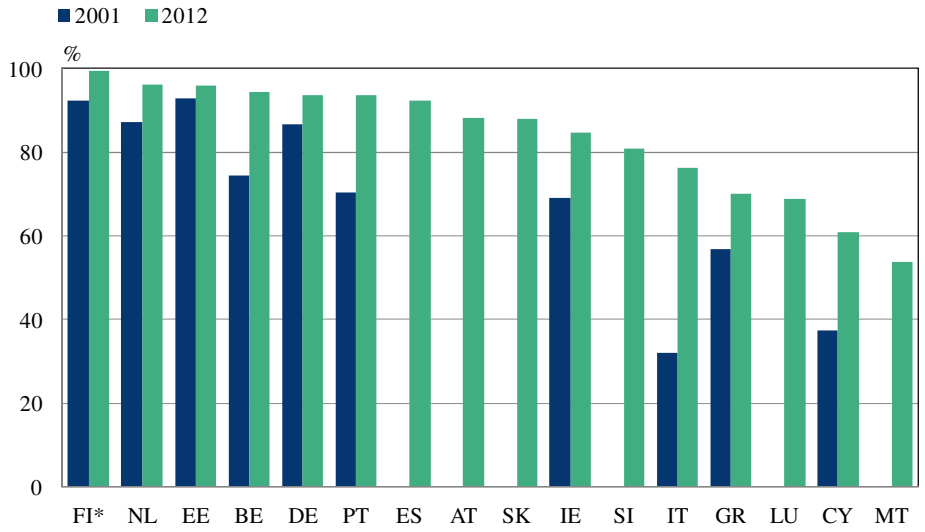
The comparison between figures 11 and 12 before indicates a shift towards a more cashless retail payment market in the past 11 years. By looking at the automation rates in the euro area countries it can be further analyzed by how well and to what extent this move correlates with the payments processing being made more electronically and automatically. Figure 13 illustrates the automation rates of selected euro area countries for 2001 and for all the euro area countries for 2012 except for France. Despite the lack of data for all the current euro area countries for the starting year 2001, the data provides us with a valid reference point for the automation rates in relation to 2012. As can be observed, the northern euro area countries have obtained a relatively high automation rate without them being too far from a 100 percent level of automation. What comes to the countries at the other end of the spectrum, the development has certainly been towards the direction of more electronic processing as countries such as Italy and Cyprus have by 2012 surpassed the 60 % level from the original below 40 % in 2001.

Kemppainen (2003, 14) underlines that even though the PSPs' view of the retail payment markets in the euro area has been that the national payment systems work in an efficient manner, some countries have still heavily relied on paper-based payment instruments while others have moved on to use more efficient electronic payment methods. This is evident when looking at the automation rates across the selected euro area countries in figure 13 for 2001 and could indicate excess inertia in the industry. The PSPs view could potentially be a result of them having been locked into a certain set of standards, which would require substantial irreversible investments hence locking the industry into a certain set of obsolete standards. Path dependence, excess inertia and the existence of natural monopolies in the former national payment markets most likely also contribute to this thus explaining the slow change observed in the payment

[16] Automation rate = (POS transactions + non-paper-based credit transfers + direct debits) / total number of transaction (excluding e-money transactions)

infrastructure side. By promoting electronic means of payment, this fragmentation and incompatibility could well be overcome and eventually result in important cost savings and efficiency gains to the euro area economy as a whole.

Figure 13: Automation rates in the current euro area countries.



* Figure for Finland is from 2011 instead of 2012 due to the missing division into paper-based and non-paper-based credit transfers.
** Figure for France is unavailable due to the missing division into paper-based and non-paper-based credit transfers.
Source: Statistical Data Warehouse of European Central Bank (18.9.2013).

Martikainen et. al (2013, 23) find in their empirical work through the use of sigma and beta convergence for the years 1995-2011 that payment behavior in the EU-27 have become more similar since the introduction of the euro. They also find that convergence in retail payment behavior has continued regardless of the current financial crisis but state that "it is hard to disentangle the effects of SEPA and those of the economic crisis on the convergence process". To this end, it is challenging to determine to what extent the convergence is attributable to SEPA as of course arguably it might also relate to the more general trend of higher automation and electronic processing in other areas as well and not just with payments. Nevertheless, this has been a clear objective for SEPA and therefore the development can most likely at least partly be attributed to the project. Further on, Martikainen et al. (2013, 23) conclude that since "economic theory and empirical findings support the fact that integration promotes competitiveness, efficiency and growth, the process of integration should be considered beneficial, even at times of extreme economic uncertainty".

6.1.3 Inefficiency of cross-border retail payments

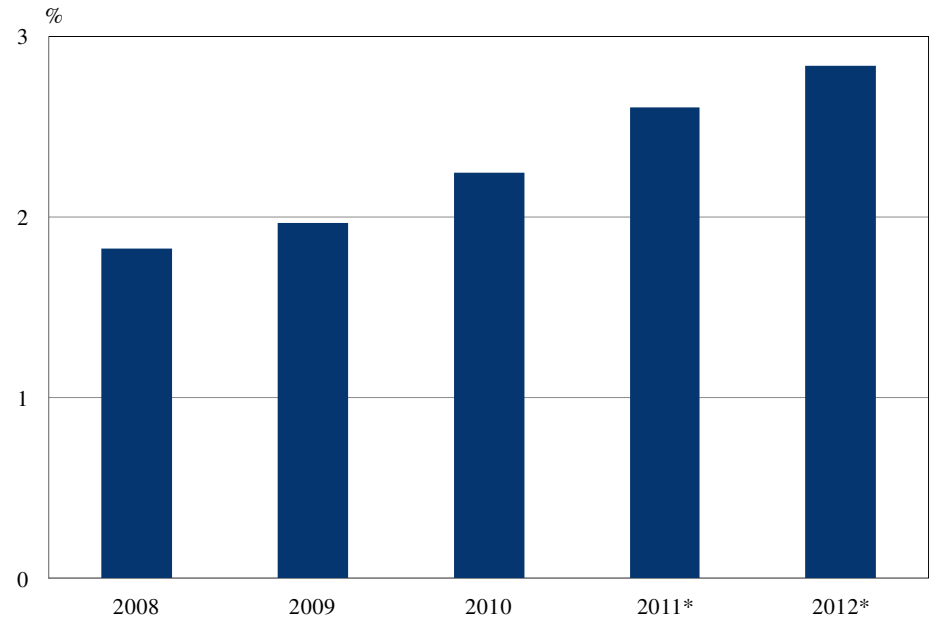
The European Central Bank (ECB 1999, 5) has stated even before the actual cash changeover of the single currency euro, that the principles of the free movement of goods, services, capital and people are fully achieved only, if citizens and business alike are able to transfer money as rapidly, reliably and cheaply from one country in the EU to another as within a member state itself. Therefore, efficient and reliable cross-border payment services are essential for the smooth functioning of the Single Market. In relation to this issue, the ECB (1999, 7) paid special focus in regard to cross-border credit transfers having substantially higher prices and execution times in comparison to domestic equivalents.

The retail payment markets within the euro area tend to differ from each other due to the fact that they were originally based on national requirements to best serve the national payment habits. There have been considerable differences in the efficiency as well as in the use of various standards. The vast majority of retail payments were national with only 2-3 % being cross-border payments. Kemppainen & Salo (2006, 70) point out that this may very well be a result of the inconvenience of cross-border payments rather than their potential demand. This claim is to some extent supported by the early European Commission's report (EC 2000, 11) on banking charges in the then 11 euro area countries. The report points out that the average charge for a credit transfer of an amount of 100 euro was 15.51 euro with significant variations between the countries: lowest in Luxembourg with 8.15 euro and highest in Ireland with 25.61 euro.

A reason behind long execution times for cross-border payments was the predominant recourse to correspondent banking in relation to international transfers as well as the lack of an adequate interbank infrastructure. Generally, this meant that a part of the processes had to be carried out manually hence having a direct impact not only on the processing costs but also on the execution times required. Since, correspondent banking is also based on bilateral arrangements between banks, this resulted in the need of a large number of arrangements required in order to achieve an adequate geographical coverage. Even if a customer provided the order electronically, it was uncommon for the formats between banks in different countries to be compatible. Hence, it was also costly for the banks to rectify any such orders. (European Central Bank 1999, 9-10.)

According to Kemppainen (2003, 14), the heterogeneous situation in retail payments in the beginning of the single currency euro has been argued to hinder development of efficient cross-border retail payment systems. He continues that this is due to the complexity of developing truly compatible systems with such a high heterogeneity in payment media demand. Furthermore, the banking sector has argued for the lack of a real business case in the context of cross-border retail payments hence also limiting the incentives for the development of efficient infrastructures (Kemppainen 2003, 16). Some evidence behind this claim can potentially be found when looking at the share of cross-border transfers from the total amount of transactions after the introduction of SEPA as illustrated in figure 14.

Figure 14: Share of cross-border transactions from euro denominated transactions 2007-2011.



* Data on cross-border transactions in Italy are not available and have been omitted here.
Source: Statistical Data Warehouse of European Central Bank (18.9.2013).

Figure 14 above indicates that the level of cross-border transactions from the total amount of transactions sent has indeed visibly increased. However, the share is barely even 3 % still in 2012. According to Schmiedel (2007, 20), increased competition in the banking industry prompted by the removal of barriers protecting former domestic markets will be one of the effects determining the final impact of SEPA. Currently, it would appear as though cross-border competition has not increased dramatically.

6.2 Increased overall efficiency

Not only do we see that some convergence has taken place in relation to the use of cashless payment instruments, a higher automation rate and the average fee structure of cross-border payments, but convergence has also taken place in relation to execution times for retail payments. The ECB (2013d, 90) points out that the average execution time for retail payments in the EU has decreased down to no more than one day while it was about five days in the early 1990s. This development, of course, cannot be fully attributed to the SEPA project. However, the ECB (2013d, 90) does point out that since 1st January 2012 the PSD has "obliged payment service providers to make funds accessible to the recipient by the end of the next business day after a payment order is received". Therefore, PSD could be argued to belong to the category of a regulatory innovation just like the SEPA Schemes themselves in general. Henceforth, also the oversight tasks of central banks and supervisory authorities are made easier through the widespread use of common standards and protocols.

Due to the higher level of automation signifying more advanced computer and communication technology and standardized operational performance in payments processing and settlement as well as higher economic efficiency and fairer pricing through the sift in ownership structures in addition to economies of scale and scope, it could be stated that an overall improvement in the euro area retail payment market has been achieved. A significant portion of this progress could be attributed to technological innovation. In addition, an ECB (2013c, 4) report would indicate that especially the level of card fraud has decreased in SEPA by hitting its lowest level in 2011 (0,036%) since 2007. The report summarizes the development in card fraud to be the result of EMV-technology by which counterfeit fraud has shifted “towards non-SEPA countries where EMV is less prevalent” (ECB 2013, 5).

When considering the pre-SEPA starting point of 2001, the euro area retail payment market could arguable be said to be closer to point C rather than point B on the risk-cost frontier framework presented in section 4.3. This is due to the high costs and risks in cross-border transactions due to technological incompatibilities as well as inefficiencies due to the use of paper-based payment instruments. The euro area payment market can therefore by no means be said to have been in an optimal outcome in 2001. With the evidence presented, it could be argued that SEPA has resulted in a movement towards point B. However, a shift of the

efficiency frontier curve left might also be possible later in time portraying a move towards point A once a higher level of integration in the euro area is obtained by which economic and technological efficiency would be even further enhanced. Such a development could be propagated by the adoption of eSEPA in the future.

Berger et. al (1996, 720) state that "new payment technologies, particularly newer electronic methods of consumer payments that may replace older paper-based methods, can potentially speed up settlement to lessen risks and reduce real resource and financial costs of making payments". The objective of SEPA is very much reflected by this idea and despite Berger et al. (1996, 720) stating that "there are typically extraordinarily long lags between the introduction of new payment methods to their widespread use" the end-date regulation is pushing for a relatively fast development within EU and hence already now illustrating some evidence of increased social utility through more efficient processing and settlement of retail payments.

Nevertheless, based on what has been observed in figure 4 in section 3.4 concerning the migration status, it must be kept in mind that the argument for a critical mass could potentially have a wide influence on the effects of SEPA observed thus far. As Guibourg (1998, 10) emphasizes, the demand for products with network externalities grows slowly at first until a critical mass is reached after which "demand grows at a substantially faster pace". It could be argued that no such effect or a major change in the demand for SEPA payment instruments has taken place on a truly European wide scale so far. Therefore, it is most likely too soon to emphasize the effects seen until today to be the final effects of the entire project.

Palva & Penttinen (2012, 101) have identified several factors of slow migration especially in relation to the migration of SCT in Finland, but it is very likely that these can also be extended to be major factors in other countries likewise. Such factors include the time consuming process of companies conducting internal system changes with the support of banking software, integrator service and Enterprise Resource Planning (ERP) providers. Also, the banks' implementation timelines for SEPA are not completely unified due to which many companies will most likely fully migrate only after each individual bank they use is ready for SEPA. Due to these factors, migration will most likely increase significantly towards the actual end-date of 1st February 2014 in the 17 euro countries only after which a more profound analysis of the final effects of SEPA and the potential efficiency gains can be performed.

7. CONCLUSION

The aim of this thesis was to examine the effects of SEPA on the fragmented European retail payments landscape and to determine its effect on retail payment market integration especially in the euro area. While integration of the large value payment market was evident in order to safeguard a uniform implementation of monetary policy within the Eurosystem, no such force was applicable to the retail payment market after the introduction of the single currency euro. Nevertheless, a user network of potentially over 500 million within Europe is by itself clearly a positive reinforcement for extending former domestic retail payment markets into a single market. This is especially the case if these users can, as presumed in the SEPA project, be linked together with innovative and competition enhancing technology.

Following through with an ambitious plan of integration within the European retail payment markets does appear as a logical path to follow after the adoption of the euro. Additional weight on this intention is induced especially when looking at pre-SEPA obstacles for cross-border transactions limiting trade and acting as a barrier for a true domestic products and services market within the Union. By looking at the current status of the SEPA project, we find the disparities between countries in 2001 to be closely related with the problems and issues faced during the migration process. Not only has this led into a slow overall migration, the average fee structure for payments in the euro area still persists to exist as relatively heterogeneous. In addition, ambiguity with the implementation of ISO standards, the drawbacks in relation to eSEPA innovations and the SEPA Cards Framework (SCF) lacking behind in progress further illustrate the challenges and the magnitude of the project.

Slow migration to SEPA Credit Transfers (SCT) and SEPA Direct Debits (SDD), the lack of publicly available cost side data from payment systems providers and the caveats of the theoretical approach used for an account-based payment system analysis limit the extent to which developments in the retail payment market can be directly attributed to SEPA. Nevertheless, we find economies of scale and scope as well as the existence of natural monopolies to be highly relevant when analyzing retail payment markets and examining how standardization can foster competition in the market. Meanwhile, path dependence, excess inertia and underinvestment would appear to explain the reasons behind the visibly slow migration into SEPA from the former domestic systems.

Despite the slow progress we find that the European retail payment market is evolving and appears to be doing so at a more rapid pace than ever before. SEPA is first and foremost a standardization initiative driving further economic and technological efficiency especially through regulatory and technological innovations but the magnitude of the initiative cannot be determined yet to any certain extent. We find that the SEPA project is far from being over. Not only is there still time left before full migration to SCTs and SDDs are obtained, no end-date has been set for the SCF. Also, new innovations based on the SEPA standards and current frameworks appear currently more as a vision of the future rather than the reality of today. The final effects of SEPA somewhat ambiguous still at this point in time and a further analysis is in place after full migration has been completed.

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